INDIA RUBBER WORLD

SYNTHETIC

JUNE, 1946

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SEMI-REINFORCING FURNACE BLACK

Godfrey L. Cabot, Inc., Boston, Mass.

CABOT

Du Pont
NEWSLETTER No. 6, JUNE 1946
RUBBER CHEMICALS DIVISION
PUBLISHED BY E. I. DU PONT DE NEMOURS & CO. (INC.), WILMINGTON 98, DELAWARE

NON-AROMATIC SOLVENTS FOR NEOPRENE

NON-AROMATIC neoprene cements can be prepared which are economical, non-toxic and have a wide range of evaporation rates. Blends of ketones or acetates with aliphatic hydrocarbons may be used as solvents. Neoprene cements employing a mixture of aromatic and non-aromatic solvents can also be formulated.

Heretofore, cement manufacturers have generally used aromatic hydrocarbons such as toluene, or blends containing a large proportion of these aromatic hydrocarbons, as the solvent in the manufacture of neoprene cements. Although these types of solvents make satisfactory cements they have several disadvantages such as toxicity, relatively high cost and limitation of control of evaporation rate.

ADVANTAGES OF NON-AROMATIC SOLVENTS

Non-aromatic solvents for neoprene have the following advantages over those based on aromatic hydrocarbons.

1. Greater control of solvent evaporation rate.
2. Lower cost.
3. Elimination of toxicity of aromatic hydrocarbons.
4. Less processing labor (in many cases it is unnecessary to masticate the neoprene before dissolving).
5. Low coefficient of penetration into porous surfaces such as fabric and leather.
6. Better storage stability of cements with respect to decrease in viscosity.

The greatest apparent disadvantage is that the viscosity per unit solids content is lower than that obtained when using straight aromatic hydrocarbons, and somewhat more neoprene may be required to obtain the desired viscosity.

TWO-COMPONENT SOLVENT BLENDS FOR NEOPRENE

Blend Component A	Blend Component B	Minimum to Maximum Range of Component A to Give Smooth Solution % by Volume
Acetone	Cyclohexane	30 - 60
Acetone	Hexane	30 - 60
Acetone	Heptane	30 - 60
Acetone	65 Octane Gasoline	20 - 60
Acetone	Kerosene	30 - 60
Methyl Ethyl Ketone	Hexane	30 - 100
Methyl Isobutyl Ketone	Hexane	30 - 100
Methyl Acetate	Hexane	30 - 60
Ethyl Acetate	High Test Gasoline	40 - 80
Benzene	High Test Gasoline	40 - 100
Toluene	High Test Gasoline	40 - 100

SELECTION OF SOLVENT

By selecting the various solvent components, cements differing in physical characteristics may be obtained. For example, a Neoprene GR-M cement made in a blend of methyl acetate, 30 volumes and high test gasoline, 70 volumes, contains methyl acetate as the more rapid evaporating component. Films of this cement lose their methyl acetate first, leaving a film of neoprene, and gasoline in which neoprene is not soluble. Because neoprene is not soluble in the residual liquid and comparatively little of the gasoline is absorbed by the neoprene, the total liquid evaporates rapidly and very high initial bond strength is obtained. This cement has the disadvantage, however, that due to the rapid loss of methyl acetate and consequent speedy transfer of the blend from a solvent to a non-solvent, the applied film is apt to be rough and lumps of neoprene may collect in the brush. As a result, this type of cement may not always be practicable.

If methyl ethyl ketone is substituted for methyl acetate in the above cement, the gasoline non-solvent portion becomes the lower boiling component and evaporates at a faster rate than does the methyl ethyl ketone. This being the case, the ratio of methyl ethyl ketone to gasoline becomes greater as the applied film loses solvent. Inasmuch as Neoprene GR-M is soluble in blends of methyl ethyl ketone and gasoline containing from 30% to 100% (by volume) of methyl ethyl ketone, the residual blend at all times is a neoprene solvent, and consequently, the cement will spread smoothly and will not exhibit any appreciable stringiness.

For further information on non-aromatic solvents for neoprene, write for our technical report BL-207.

DU PONT
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

India Rubber World, June, 1946, Vol. 114, No. 3. Published Monthly by Bill Brothers Publishing Corp. Office of Publication, Orange, Conn., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U. S. A. Entered as Second-Class Matter at the Post Office at Orange, Conn., under the Act of March 3, 1879. Subscription, United States and Mexico, $3.00 per Year; All Other Countries, $4.00. Single Copies 35 Cents. Address Mail to New York Office.

SUPERB OIL RESISTANCE

is only one of Hycar synthetic rubber's unusual and valuable properties. Others are listed in the box at the right.

But most important, these properties may be had in an almost limitless number of combinations, each designed to meet specific service conditions of the finished Hycar part.

Our files contain more than 5000 recipes for Hycar compounds—each compound engineered to do a certain job. Parts made from HYCAR have seen service in *every* industry, giving long life, dependability, and economical operation.

That's why we say, ask your supplier for parts made from Hycar Test them in your own application, difficult or routine. You'll learn for yourself that it's wise to use HYCAR for long-time, dependable performance. For more information, please write Department HC-6, B.F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

CHECK THESE SUPERIOR FEATURES OF HYCAR

1. EXTREME OIL RESISTANCE — insuring dimensional stability of parts.
2. HIGH TEMPERATURE RESISTANCE—up to 250° F. dry heat; up to 300° F. hot oil.
3. ABRASION RESISTANCE—50% greater than natural rubber.
4. MINIMUM COLD FLOW—even at elevated temperatures.
5. LOW TEMPERATURE FLEXIBILITY—down to —65° F.
6. LIGHT WEIGHT—15% to 25% lighter than many other synthetic rubbers.
7. AGE RESISTANCE—exceptionally resistant to checking or cracking from oxidation.
8. HARDNESS RANGE—compounds can be varied from extremely soft to bone hard.
9. NON-ADHERENT TO METAL—compounds will not adhere to metals even after prolonged contact under pressure. (Metal adhesions can be readily obtained when desired.)

Hycar
Reg. U.S. Pat. Off.

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Synthetic Rubber

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A DIVISION OF THE B. F. GOODRICH COMPANY

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If you want champion qualities in your products . . . qualities that enable them to take a lot of hard knocks and not fail . . . resistance to cut and crack growth . . . in a word, if you want your products to give champion performance...use Philblack A.

These are a few of the Philblack A features that help make your products winners! High hot tensile . . . good heat and electrical conductivity . . . good abrasion . . . low set . . . high modulus . . . excellent appearance of finished product . . . *and always* . . . easy processing and fast curing!

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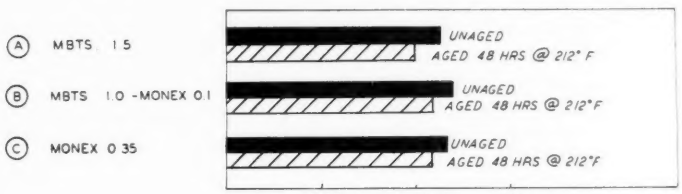
MONEX

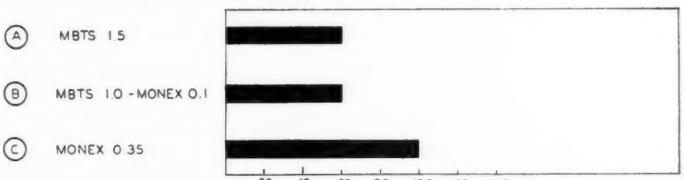
MONEX IS EXCELLENT ACCELERATION FOR GR-A

MONEX IS STRONG AND AGES WELL



TENSILE STRENGTH *psi* - AV. 30, 60, 90 MIN. CURES

MONEX IS SAFE TO PROCESS



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PROCESS · ACCELERATE · PROTECT

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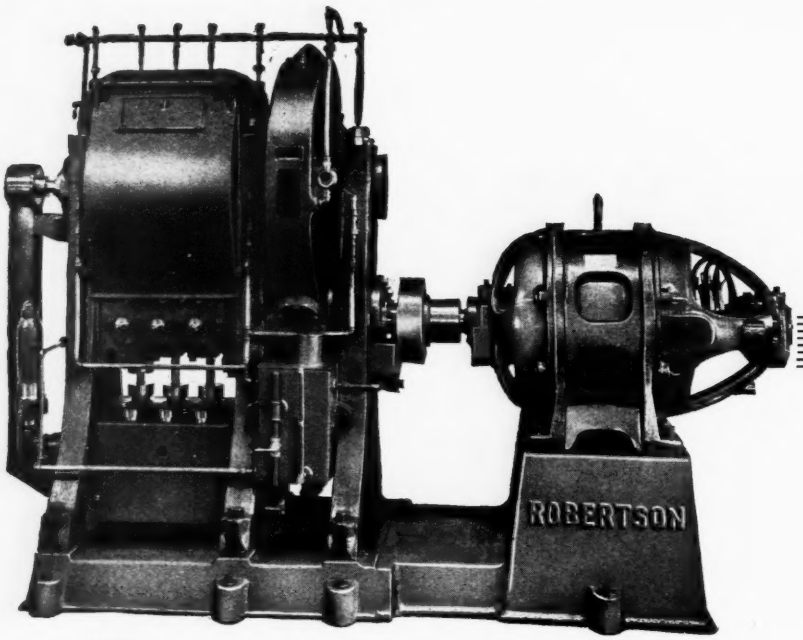

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Purpose . . . To give you GR-S stocks with level curing properties, better aging characteristics, and increased flex crack resistance.

Naftex

Purpose . . . To give you a free-flowing pellet mixture of carbon black and sulfur-reactive plasticizer that will reduce mixing time, reduce carbon black dust, and eliminate the handling of liquid plasticizers in your plant.

Wilcor-Plast

Purpose . . . To give you an exceptionally low-cost plasticizer for general use in synthetic, natural, and reclaimed rubber compounds.

Wilmac D-X

Purpose . . . To give your highly loaded Silene-GR-S stocks easier mixing and better processing properties, with reduced adherence to mill rolls.

Plasticizer Emulsions

Purpose . . . To give you water dispersions of rubber plasticizers that can be used to advantage in latex compounds and adhesives.

Wilcorite R-30

Purpose . . . To give you a modified phenolic resin that is specifically designed to impart tack to GR-S.

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Purpose . . . To give you modified phenolic resins for use with BUNA N type rubbers, with the possibility of obtaining a wide range of unique properties.

Wilcorol P-200W

Purpose . . . To give you an all-purpose resorcinol adhesive for bonding a large variety of dissimilar materials, including rubber.

Wilcor Reclaiming Oil No. 111

Purpose . . . To give you a reclaiming oil that will swell both GR-S and natural rubber scrap to the same extent.

W-C=C

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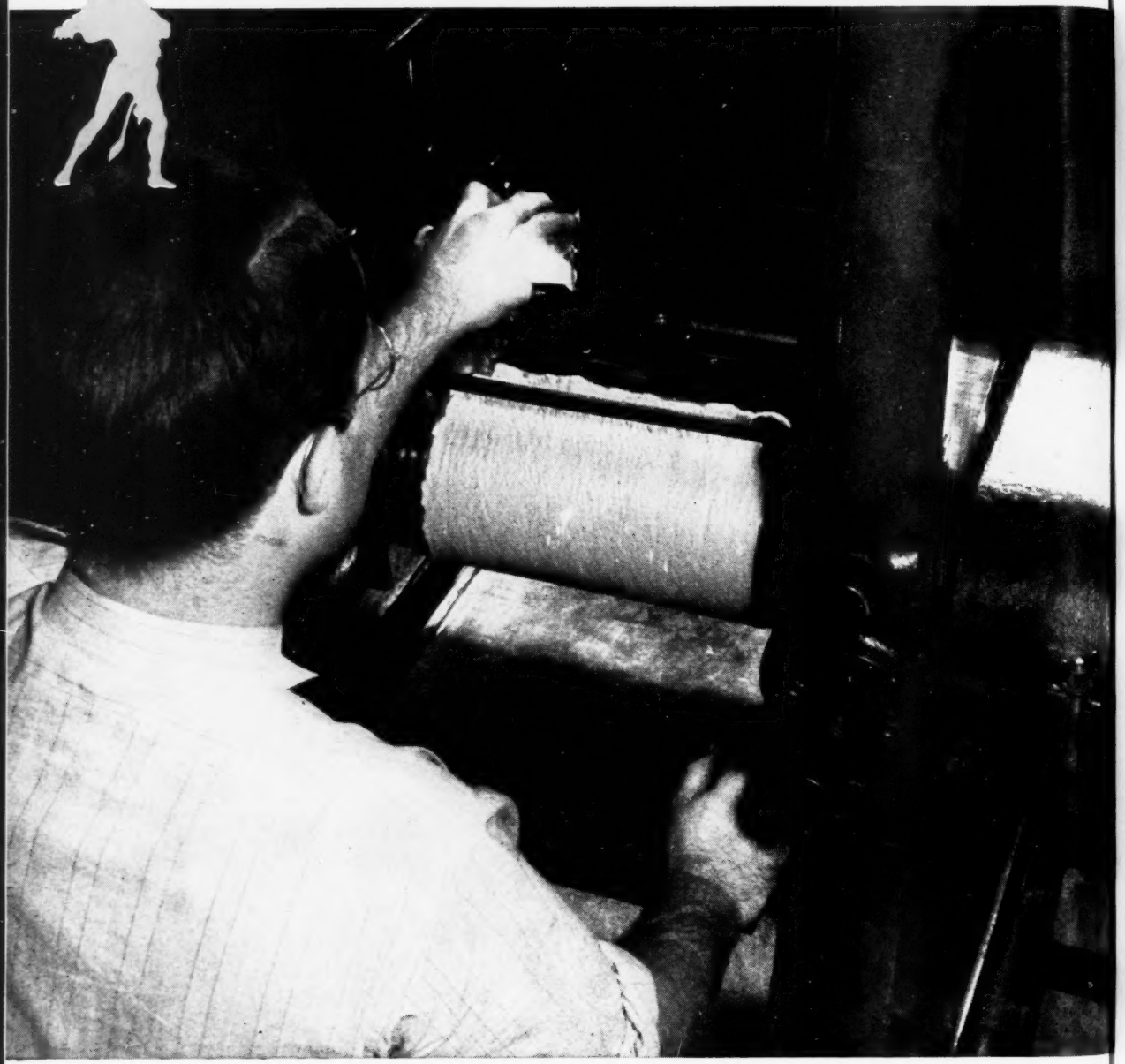
HERCULES RESEARCH



This mill is used by Hercules to investigate rubber compounding methods and to prepare samples for testing.

IT PAYS TO
KNOW *MORE*
ABOUT

HERCULES

GIVES RUBBER LONGER LIFE

When war-time emergencies demanded tougher, longer-wearing synthetic elastomers, Hercules answered the challenge. As a first step, Hercules built a well-equipped rubber testing and polymerization laboratory.

Working in close cooperation with the rubber industry, Hercules chemists developed Dresinate* 731, the resin emulsifier that made GR-S-10 possible, and is largely responsible for the success of GR-S-10 for automobile and truck tires and other rubber products.

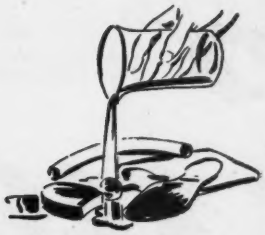
Hercules research has also contributed to the longer life of *reclaimed* rubbers—with special solvents. Solvenol*, a strong solvent, with a slow evaporation rate, is widely used in rubber reclaiming. It is also used in synthetic rubber compounding.

All the chemical materials listed at right, and many more, are the result of Hercules' constant research and wide knowledge of rubber chemistry. For specific information on any of these materials, or for advice on how Hercules research can complement yours, mail the coupon today.

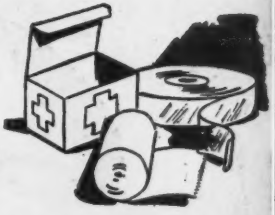
*Reg. U. S. Pat. Off. by Hercules Powder Company

CHEMICAL MATERIALS FOR THE RUBBER INDUSTRY

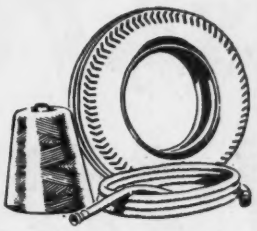
Hercules chemical materials for the rubber industry include:



Solvenol* . . .
A strong solvent for rubber, with a slow rate of evaporation. Widely used in rubber reclaiming.

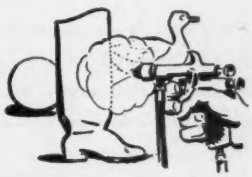


Staybelite* Esters . . .
Low-cost tackifiers, compatible with all synthetic rubbers. Valuable in pressure-sensitive adhesives.

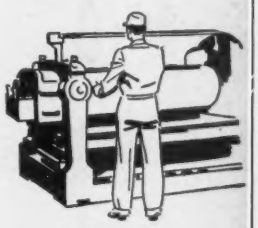


Chemical Cotton . . .
Basis for the toughest high-tenacity rayon for automobile tires, hose, belting, and other rubber products.

Dresinate* 731 . . .
One of Hercules' many resin derivatives, Dresinate 731 is the emulsifying agent used to make GR-S-10.



Nitrocellulose . . .
Hercules nitrocellulose and ethyl cellulose provide lacquers of maximum adhesion, durability, gloss, and color.



Staybelite* Resins . . .
Odorless, non-staining softeners for natural rubber.

FOR FURTHER DETAILS

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(LIQUID CONCENTRATE)

LUBRICANT

Yes GLYCERIZED *has proved to be an essential agent in modern day rubber processing!* . . . . . .

GLYCERIZED eliminates unhealthful and annoying 'dust' arising from the use of soapstone, talc, etc. Merely by dipping the slabs as they are cut from the mixing mill into a GLYCERIZED solution, all stickiness is done away with. Complete separation of piled stocks is assured. Adhesion is abolished! The cost is but a fraction of the former, old dusty method.

GLYCERIZED solution prevents sticking during cure of extrusions and tubing, when coiled on the flat pan or continuous running. Lubrication of molds, mandrels, air bags, belt drums, insulated wire and cable, etc. are all vastly facilitated by applications of GLYCERIZED solution.

Inner tubes, automotive parts and other molded and extruded goods are washed and finished readily with GLYCERIZED solution. It cleans thoroughly and lends that glossy, satiny finish so desirable in rubber products. Specific directions and proportions are furnished with each shipment.

GLYCERIZED is truly a versatile lubricant adapted to all types of synthetic rubbers as well as to natural rubber, reclaim or mixture thereof. During war and peace, GLYCERIZED LUBRICANT has served faithfully throughout the entire rubber industry. Many rubber concerns who won the Award for Excellence in War Production received consistent support in supplies of GLYCERIZED LUBRICANT which were at all times unfaltering.

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Yes GLYCERIZED *has well earned its place as the established lubricant in rubber processing* . . .

AVAILABLE IN DRUMS, HALF DRUMS AND QUARTER DRUMS.

QUALITY SINCE 1884

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Everyone agrees that economy and reliability are important considerations in selecting reclaims . . . that's why more and more leading manufacturers of rubber products are prescribing Buffalo Reclaims.

You'll be interested to know that behind BUFFALO RECLAIMS are 64 years of experience and research; BUFFALO subjects ALL its reclaims to rigid laboratory control . . . to assure you high-quality uniform grades.

We are happy to place our experience and technical advice at the service of the industry . . . we will give your reclaimed rubber problems our careful attention.

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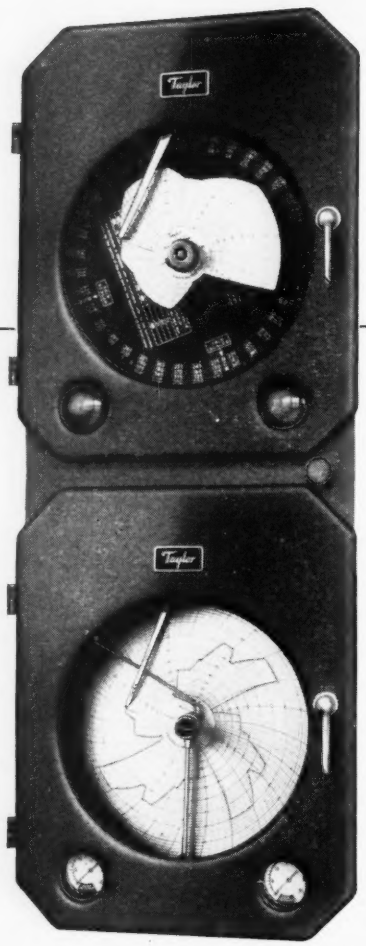
64 Years Serving the Industry Solely as Reclaimers

You can make SYNTHETIC RUBBER ACT NATURAL

with a Taylor Fulscope Time Schedule Controller



MOST of your troubles in curing synthetic rubber goods can be over before they begin—if you have *precise temperature control on a time-schedule basis.* That's what you get with Taylor Fulscope Time Schedule Controllers applied to your vulcanizers. They give you:

1. **Push-button control**
2. **Controlled rate of rise to curing temperature**
3. **Curing time adjustable in 1 to 6 ratio**
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6. **Opens blow-down valve**
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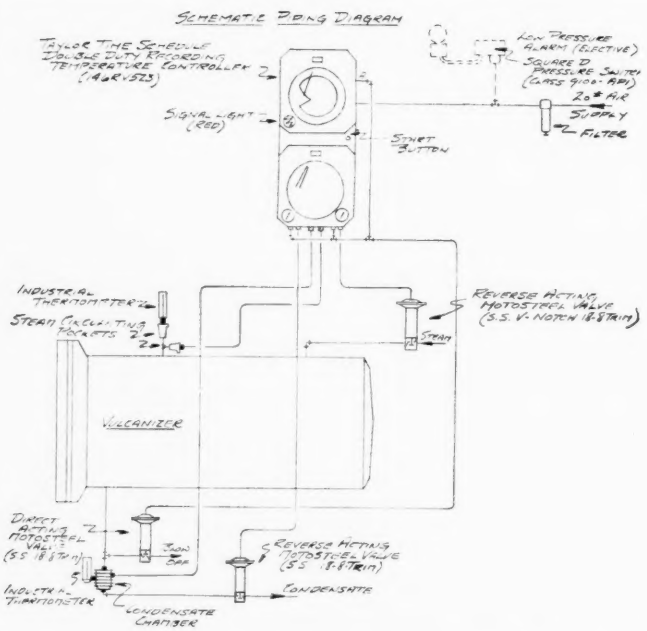

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

We're proud of the Taylor Time Schedule Controller because it's one of the most versatile and flexible instruments ever made. And it works equally well on vertical vulcanizers. In fact, it does *every* job with the same typical Taylor Accuracy! Call your Taylor Field Engineer for more details. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.

Announcing

PEPTON 22

AN IMPROVED PLASTICIZER FOR

GR-S... NATURAL... MIXTURES

OF GR-S AND NATURAL RUBBER

PEPTON*22 PLASTICIZER is a non-toxic, non-staining peptizer or catalytic plasticizer for the various types of GR-S and natural rubber. It is the result of years of research directed to solve the specific problem of obtaining or approaching the desired plasticity in rubber and synthetic rubber compositions.

WHAT PEPTON 22 WILL DO

1. Reduce breakdown time and save power
2. Increase production capacity
3. Produce softer GR-S or natural rubber in a given milling time
4. Produce soft GR-S with plasticities which show no appreciable change on standing
5. Control GR-S gel build-up in hot processing
6. Plasticize reclaimed rubber, mixtures of reclaimed rubber and GR-S or natural rubber, and also mixtures of GR-S and natural rubber
7. Produce softer or more plastic GR-S or natural rubber mixed stocks in direct mixing
8. Reduce heat developing in processing and thereby lower the processing temperatures
9. Improve processing qualities and reduce rejects
10. Give good physical properties

WHAT IT WILL NOT DO

1. Produce dermatitis or toxic effects
2. Discolor white or light colored stocks
3. Bloom
4. Affect aging adversely

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(A Unit of American Cyanamid Company)

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When Performance Counts... Call on Cyanamid

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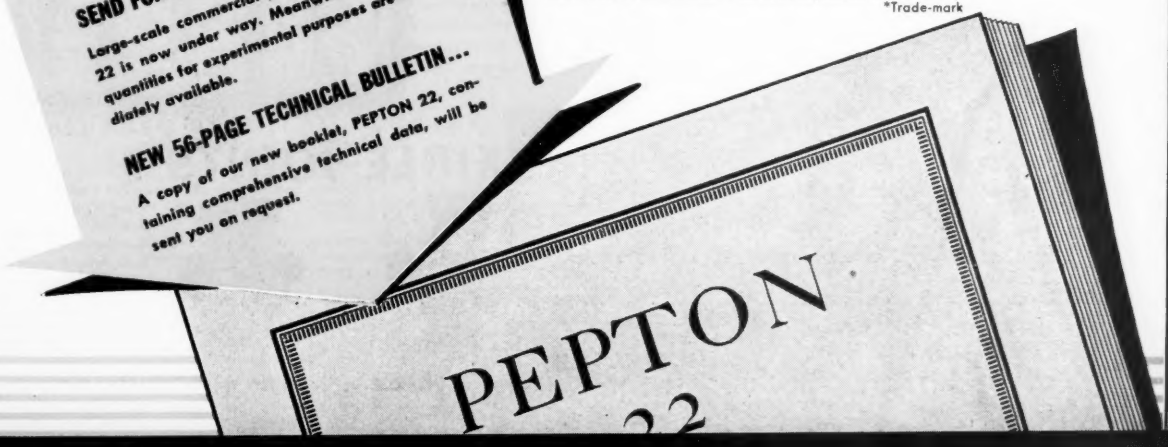
*Trade-mark

SEND FOR SAMPLE QUANTITIES...

Large-scale commercial production of PEPTON 22 is now under way. Meanwhile, pilot plant quantities for experimental purposes are immediately available.

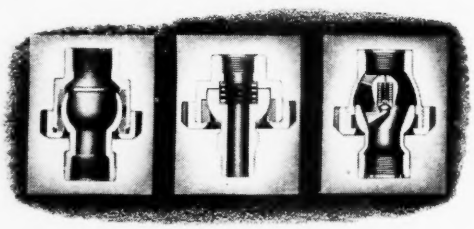
NEW 56-PAGE TECHNICAL BULLETIN...

A copy of our new booklet, PEPTON 22, containing comprehensive technical data, will be sent you on request.



KEEP THE JITTERS OUT OF FLUID LINES

ANY fluid conveying system may develop a bad case of the "shakes" unless you protect it from vibration and shock. Barco Flexible Joints compensate for shock expansion and contraction... allow the necessary "give and take" that assures longer, more trouble-free service. For over 30 years Barco has been providing such protection in every field of transportation and industry. Detailed engineering data sent on request.



BARCO FLEXIBLE JOINTS

Not just a swivel joint ... but a combination of a swivel and ball joint with rotary motion and responsive movement through every angle.

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

"MOVE IN EVERY DIRECTION"

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General Chemical Fluorine Research Presents...

THE CATALYST TO CHART NEW COURSES FOR AMERICAN INDUSTRY

Boron Fluoride Etherate . . . valuable catalytic chemical of wide ranging potentialities for American Industry!

This new liquid fluorine compound has a multitude of uses. Technical literature—filling volumes—contains extensive data on the reactions catalyzed by BF_3 as well as by its complexes with other organic molecules. Repeated reference is made to its superiority to other catalysts since reactions are moderated and fewer undesirable by-products result.

Outlined at right are some of the principal applications for BF_3 as a catalyst. Perhaps they indicate ways in which you can utilize a chemical of these characteristics in your development or production program.

Boron Fluoride Etherate is commercially available in drums. For full information, contact General Chemical Company, Fluorine Division, 40 Rector Street, New York 6, N. Y. When writing, if you outline your proposed application for this new catalyst, the technical experts of our Fluorine Division can work with you toward an early solution of your problem.

Physical Properties

Formula:

$$(C_2H_5)_2O.BF_3$$

Mol. Wt.	141.9
Melting Pt.	Less than —60°C
Boiling Pt.	125°C
Spec. Gr.	1.14 at 25°C
%BF_3	47.8% min.

Some of the Principal Reactions Catalyzed by BF_3

1. Polymerization of unsaturated compounds such as olefins, diolefins, vinyl ethers, fatty oils, and terpenes. The products may be solid polymers useful as plastics or liquids as in the bodying of drying oils for paints and varnishes.

2. Condensation of aromatic nuclei with olefins and diolefins, paraffins, and olefins, and aromatic nuclei or olefins with acids.

3. As a cyclizing agent for rubber.

4. As an esterification catalyst.

5. As a catalyst in the synthesis of aliphatic acids from alcohols and carbon monoxide.

6. As a promoter and dehydrating agent in the sulfonation and nitration of aromatic compounds.

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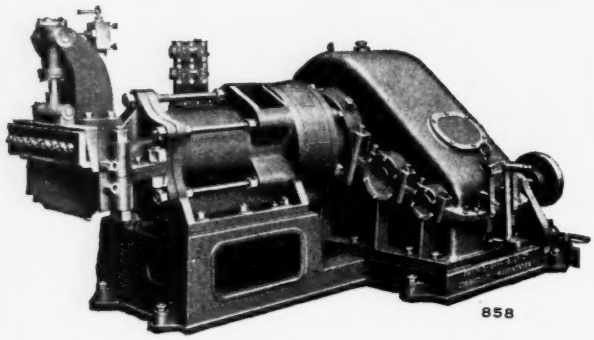
FOR AMERICAN INDUSTRY

SHAW RUBBER EXTRUDERS

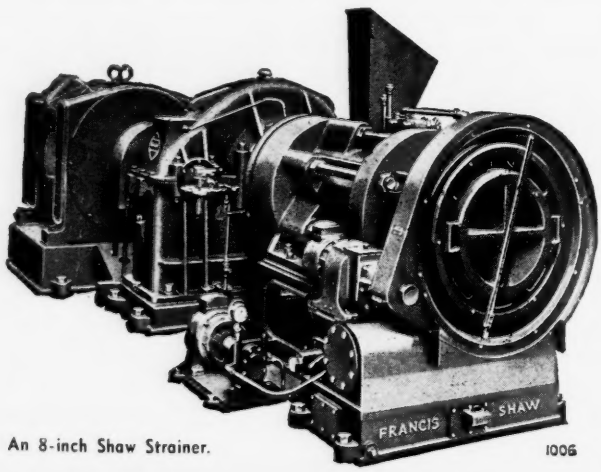


An 8-inch Shaw Extruder
for Tyre Tread Production

We have been making all types of extruders for the rubber industry since 1879

Your enquiries will receive the benefit of over 65 years experience in the design and manufacture of sound machines.

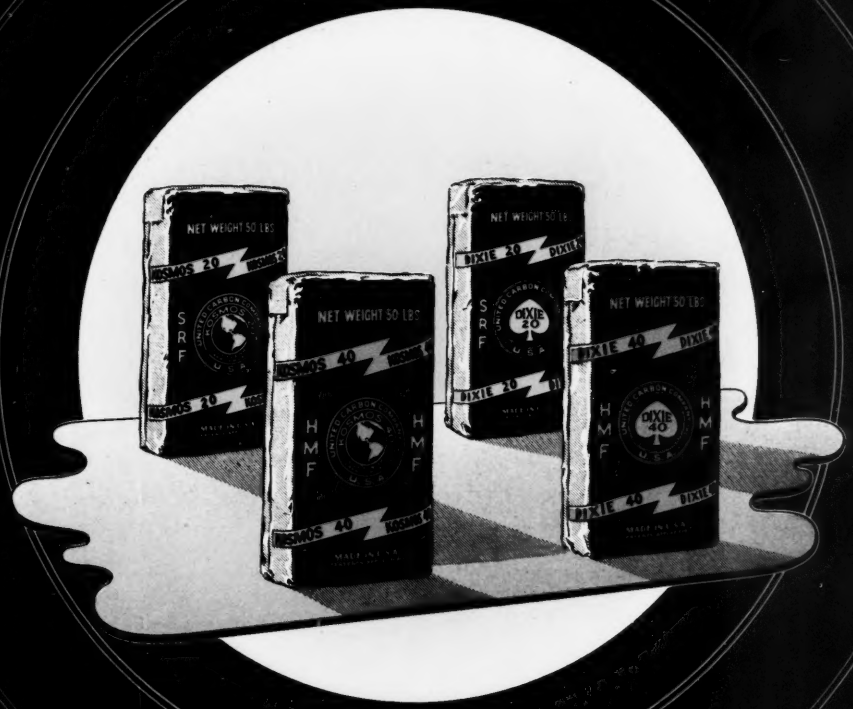
WE CAN EQUIP COMPLETE TYRE PLANTS AND GENERAL RUBBER PROCESSING FACTORIES WITH MACHINERY PRODUCED ON MODERN PLANT BY SKILLED WORKMEN AND TECHNICIANS.



An 8-inch Shaw Strainer.

FRANCIS SHAW & CO. LTD. MANCHESTER 11 ENGLAND

R-138



UNITED BLACKS, uniform, dependable, are custom-built for particular tasks. Among UNITED BLACKS is the one made for your special use. UNITED'S bags, as the illustration shows, are easy to handle, easy to recognize. For all-round performance, for all-round convenience use dependable UNITED BLACKS.

UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

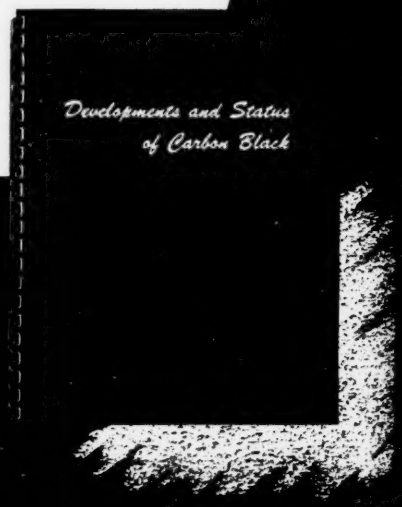
NEW YORK • AKRON • CHICAGO

MEASURING HEAT GENERATION IN RUBBER
WITH A FLEXOMETER IN UNITED'S LABORATORY

Status of Carbon Black

Time has proven and established the vital need for carbon black in reinforcing rubber. A growing carbon black industry has met the ever-increasing demand with both quantity and quality. Today's requirements call for cool mixing, easy processing carbon blacks, which possess maximum reinforcement, low heat generation, best aging and peak resistance to wear, tear, flexing and cut-growth. UNITED CARBON, INC., is continuously providing improved types so essential to the success of post-war tires and will help your Company keep posted on new developments brought about by research. For carbon blacks of merit, uniformity and dependability, use UNITED BLACKS.

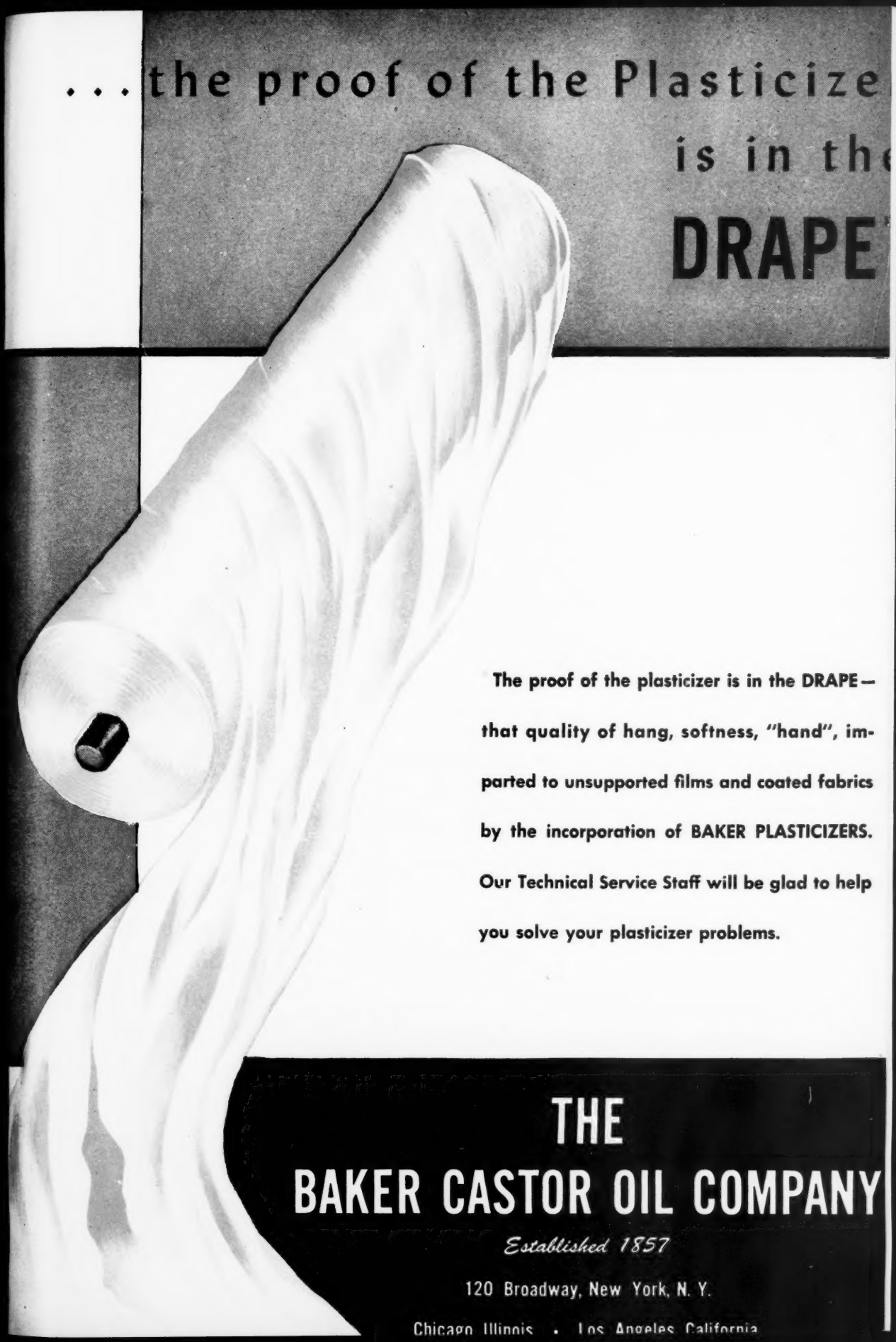
Would you like to have a copy of "Developments and Status of Carbon Black"? It will be sent you on request.



RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

Charleston 27, West Virginia



The proof of the plasticizer is in the DRAPE—that quality of hang, softness, "hand", imparted to unsupported films and coated fabrics by the incorporation of BAKER PLASTICIZERS. Our Technical Service Staff will be glad to help you solve your plasticizer problems.

THE BAKER CASTOR OIL COMPANY

Established 1857

120 Broadway, New York, N. Y.

Chicago Illinois • Los Angeles California

Calumet-

-a G.R.S. WHOLE TIRE RECLAIM

Another Pequanoc Quality Standard

★

Low Gravity • High Tensile
Laboratory Controlled

★

Calenders and Tubes Well
Cuts Compounding
and Processing Costs!

★

This addition to the Pequanoc line of reclaim has many uses and in the not too distant future will be produced in volume to meet your requirements.

★

PEQUANOC RUBBER CO.

QUALITY RECLAIMS FOR SPECIFIC PURPOSES

BUTLER NEW JERSEY

NOW

CYCLOHEXANE

FROM *Petroleum*

Another Phillips "1st"—Cyclohexane from petroleum in tank car quantities... announced for the first time ...at a Price Competitive with Benzene and Toluene.

PROPERTIES

(Current Production)

PRODUCT ANALYSIS	Mol %
Normal Hexane	1.0
Methylcyclopentane	1.0
2,2-Dimethylpentane	3.3
2,4-Dimethylpentane	5.8
CYCLOHEXANE	86.1
3-Methylhexane	2.8

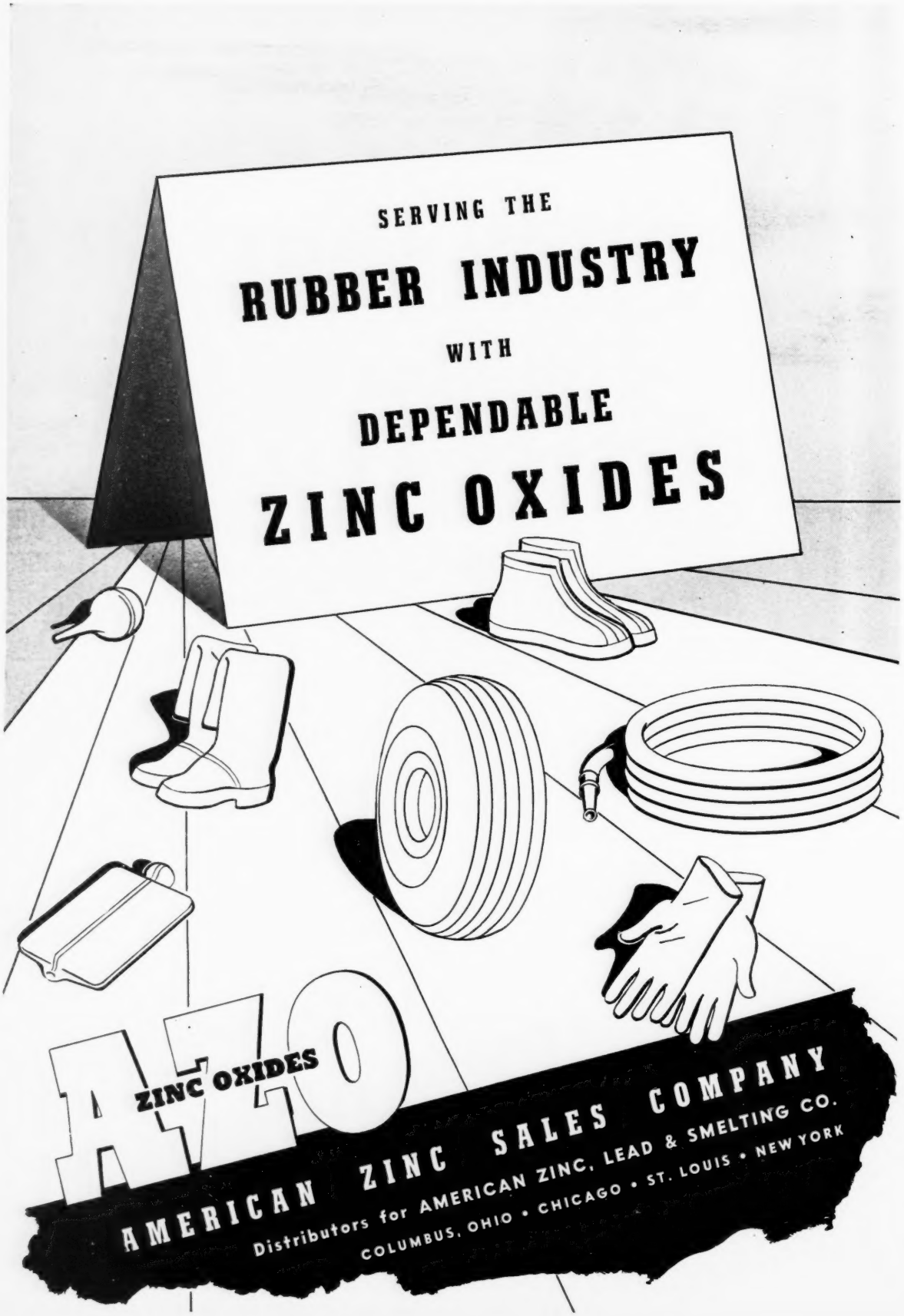
DENSITY at 20° C.	0.7728
REFRACTIVE INDEX at 20° C.	1.4224
KAURI BUTANOL VALUE	48.0
DIMETHYL SULFATE VALUE, %	7.0
ACID WASH COLOR NUMBER	3.0
BOILING RANGE ° C.	78-80
FREEZING POINT ° C.	-13

All other components are unreactive paraffinic hydrocarbons thus making Phillips Cyclohexane especially valuable as a chemical intermediate. Minimum toxicity, good solvent power, and low price place this new product on a competitive basis with benzene and toluene. Cyclohexane offers especially interesting possibilities in the rubber, paint and lacquer fields and presents additional application opportunities in numerous other industries where cost has made its use prohibitive in the past. Phillips Cyclohexane is now available in quantities from 1 gallon to tank cars. Write today for further information.

PHILLIPS PETROLEUM COMPANY

Chemical Products Department

BARTLESVILLE, OKLAHOMA


SERVING THE
RUBBER INDUSTRY
WITH
DEPENDABLE
ZINC OXIDES
AZO
ZINC OXIDES
AMERICAN ZINC SALES COMPANY
Distributors for AMERICAN ZINC, LEAD & SMELTING CO.
COLUMBUS, OHIO • CHICAGO • ST. LOUIS • NEW YORK

For Faster, More Efficient RECLAMATION OF GR-S RUBBER COMPOUND SCRAP

Because practically all scrap available today is synthetic, reclaimers will be interested in this new **ADAMSON UNITED REFINER** designed especially to meet **GR-S** requirements.

GENERAL DESIGN:
Extra rigid. Will withstand approximately 50% increase in power requirements.

ROLLS:
Ground, crowned and chamber-*bored* to insure roundness at high temperatures. May be operated tight together with uniform pressure during entire revolution.

STOCK GUIDES:
Re-designed to obtain maximum working distance lengthwise of the roll and between the guides.

HOUSINGS:
Special—not conventional type used on 60" Mills. Provide extra height from feet to rolls, permitting a full width conveyor belt to pass below the rolls.

ROLL BEARINGS:
Water cooled . . . designed for high temperatures . . . high separating pressures.

GEARING & GUARDS:
Drive gears have cut teeth and are of fine pitch to insure vibrationless operation. Connecting gears designed to obtain a lineal speed differential of more than 2.50:1 between the two rolls. Guards are oil tight. Drain pan made in conjunction with connecting gear guard.

KNIFE SCRAPER:
Operated toward and away from the fast roll. Holder permits many regrindings of knife before discarding.

WIND-UP:
A simple, sturdy attachment for winding finished product on drum. Drums are driven by pulley and round belt direct from connecting gear pinion.

Why not let us send you complete details on this refiner and other **ADAMSON UNITED** rubber processing equipment? Our engineers will be glad to cooperate with you on plans to increase production.

Products Manufactured by
ADAMSON UNITED COMPANY

- Mills
- Crackers
- Washers
- Tubing Machines
- Large Molds
- Pot Heaters
- Vulcanizers
- Autoclaves
- Hydraulic Presses
- Multi-Platen Presses
- Automatic Curing Presses
- Belt Curing Presses
- Compression Molding Presses
- Plywood Presses
- Auxiliary Equipment
- Refiners
- Mixers
- Calenders

ADAMSON UNITED COMPANY
730 CARROLL ST., AKRON 4, OHIO
SUBSIDIARY OF
UNITED ENGINEERING AND FOUNDRY COMPANY
Plants at Pittsburgh, Vandergrift, New Castle, Youngstown, Canton

PUSS IN BOOTS

THE famous story does not state whether or not the boots were made of rubber. We do know that Puss would have been highly pleased with rubber footwear in which PELLETEX was used in the compound.

Manufacturers of rubber boots, overshoes, heels and soles find PELLETEX, leading semi-reinforcing furnace black, extremely economical as well as easy to process. PELLETEX Compounds age well, have high resistance to oil and solvents, and make rubber footwear that has superior resilience and freedom from cracking.

MANUFACTURER • DISTRIBUTOR

GENERAL ATLAS CARBON CO.

PELLETEX

CASTEX

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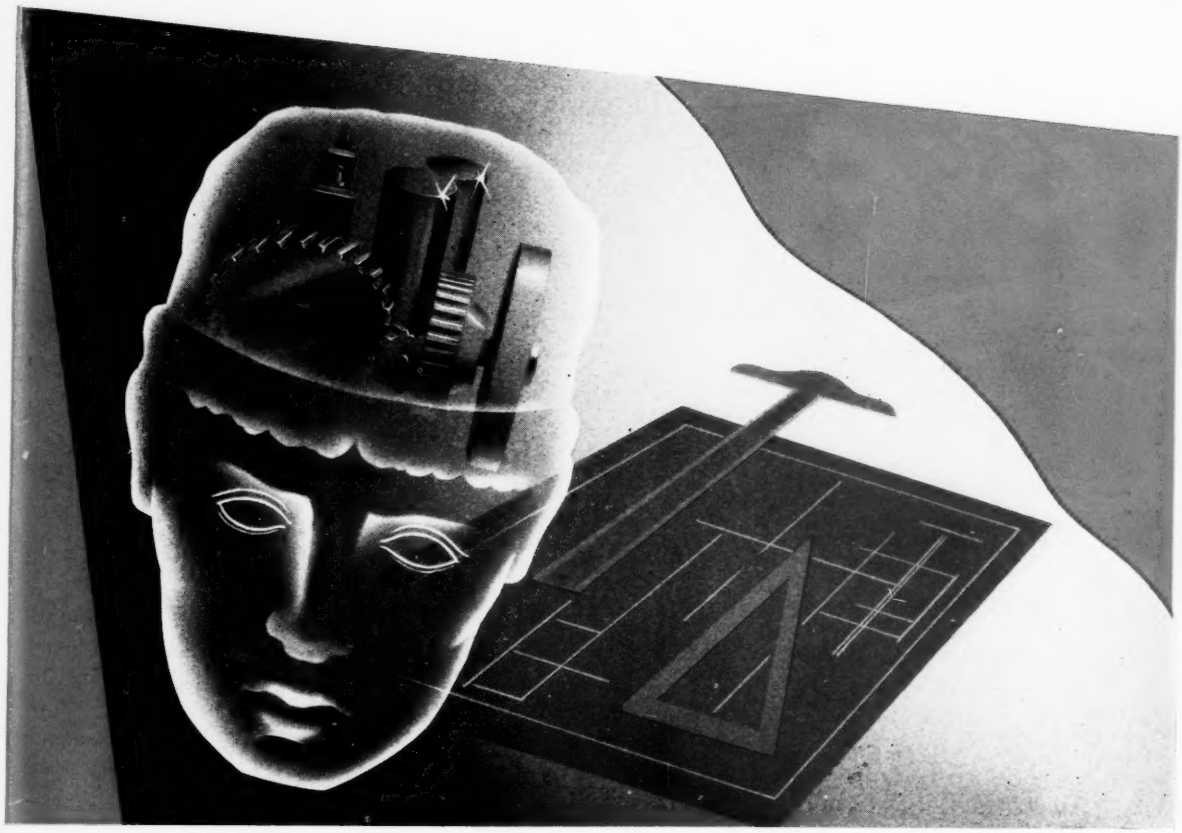
NEW YORK, N.Y. AKRON, OHIO

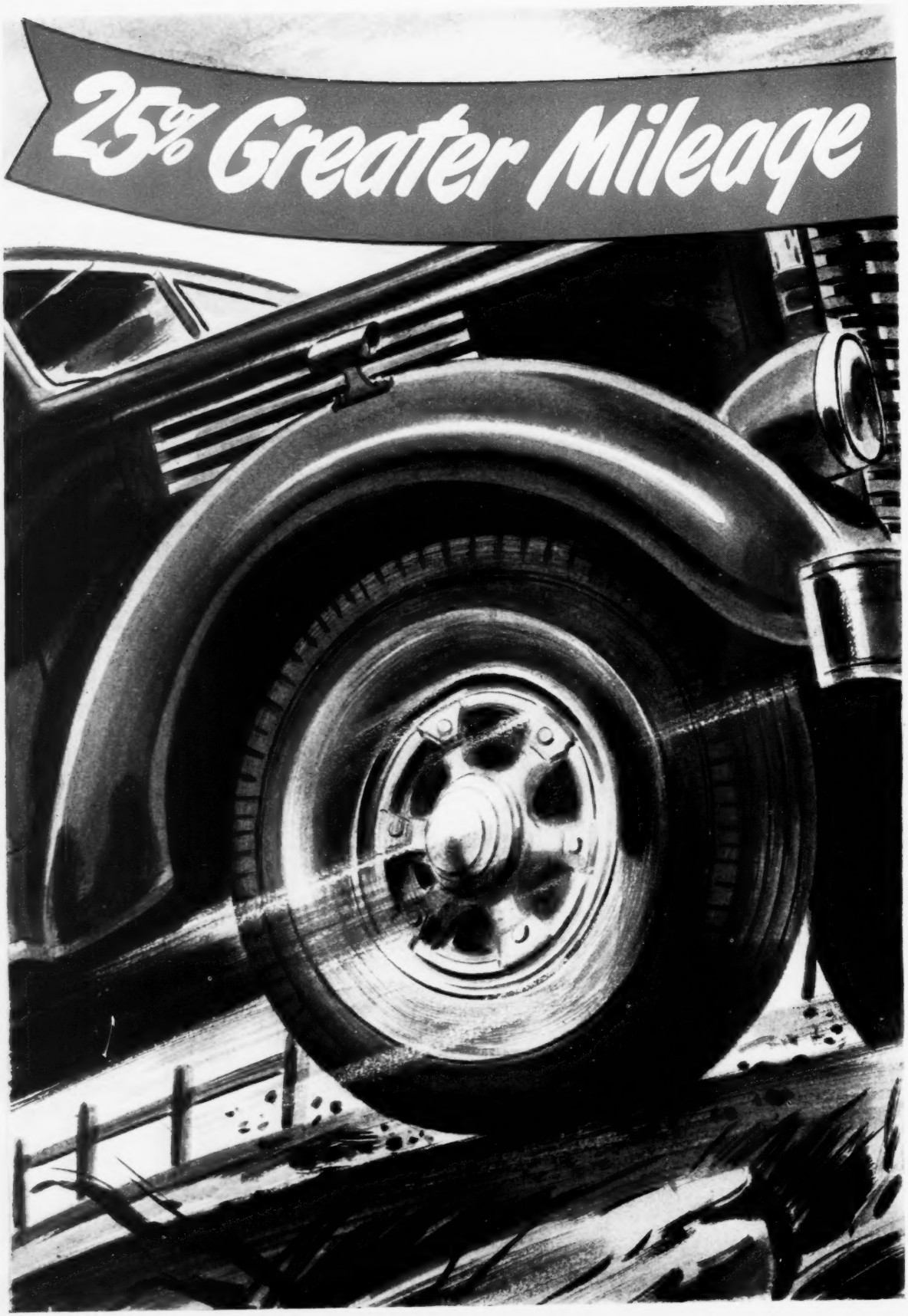
RUBBER H AND M PIGMENTS Chemicals



CLOTHING FOR BRAIN-CHILDREN

Perhaps you're mulling over a bright idea in your mind . . . maybe it's even reached the blue print stage. When you arrive at the "finishing point" it's time to talk it over with Stanley. Our sole specialty is creating finishing formulas for industry's brain-children and our experience covers a broad range of products. Inquiries incur no obligation . . . write to the Stanley Chemical Company, manufacturers of Stanley Enamels, Synthetics, Lacquers and Japans, East Berlin, Connecticut.

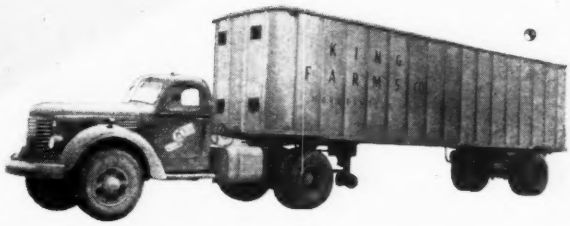
Stanley Chemical


25% Greater Mileage

with Rayon Cord

Charles E. Williams, *Superintendent of Equipment,* King Farms Company, Morrisville, Pa., maintains over 100 vehicles at this large farm. He reports:

"We find rayon cord gives us 25 per cent greater mileage in operating our fleet over a million miles a year. Our experience with rayon over a period of six years has also shown increased safety with heavy loads, and better recapability."



HERE ARE THE REASONS WHY

Science shows that rayon's molecular structure and physical uniformity, combined with its greater strength, permit a cooler running tire. At the same time, rayon retains its tensile strength better when running temperatures get high. This means fewer blowouts, bruises, cuts . . . principal tire maintenance problems. But it particularly means better mileage . . . and better condition of carcasses for recapping. No wonder so many bus and truck companies everywhere report fewer road delays with rayon . . . and higher speeds with greater loads more safely hauled.

AMERICAN VISCOSE CORPORATION

America's largest producer of rayon

Offices: 350 Fifth Avenue, New York 1; Charlotte; Cleveland; Philadelphia; Providence; Washington; Wilmington.

Our free booklet, "The Record of Rayon in Tires," gives dozens of interesting facts about rayon cord that make clear its importance in tires of today and tomorrow. Order your copy now. Just clip and fill in the coupon.

AMERICAN VISCOSE CORPORATION IR-6
350 Fifth Avenue, New York 1, N. Y.

Gentlemen:

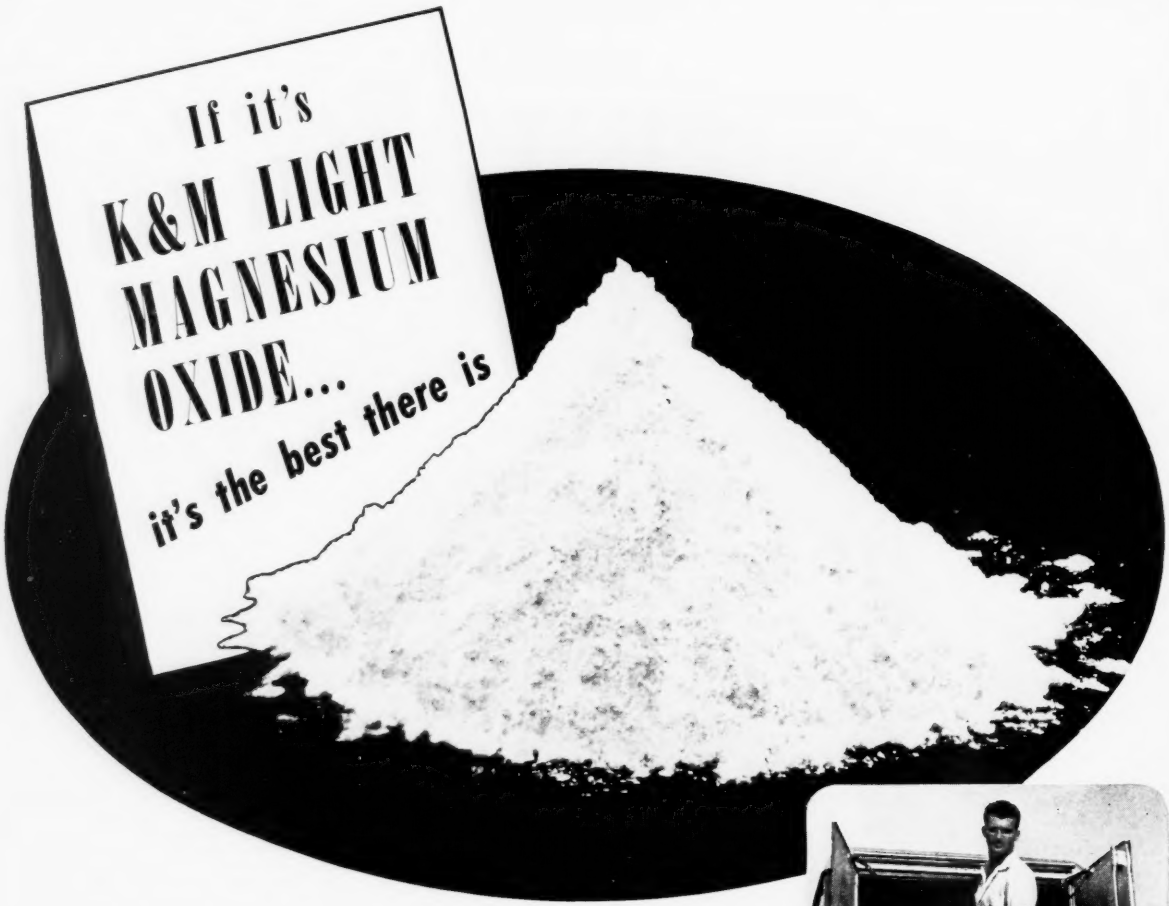
Please forward a copy of "The Record of Rayon in Tires."

*Name*_____

*Firm*_____

*Street*_____

*City*_____ *State*_____



• In the compounding of neoprene, K&M Light Magnesium Oxide has *proved* that top quality pays off. That is why so many leading neoprene compounders insist on K&M Light Magnesium Oxide.

Originating in crude Dolomite rock, this feather-light powder was carefully developed by America's pioneer manufacturer of magnesia products to meet the specific needs of neoprene compounders. One grade only is produced . . . the *finest*.

K&M Light Magnesium Oxide is available now . . . order it from one of the stock points listed below.

Neoprene-covered seismograph cable
Photo Courtesy: General Geophysical Company

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

One of America's oldest and most reliable makers of asbestos and magnesia products

OUR DISTRIBUTOR FOR LIGHT MAGNESIUM OXIDE IS:

AMERICAN CYANAMID & CHEMICAL CORPORATION
30 Rockefeller Plaza, New York 20, N. Y.

WITH SALES REPRESENTATIVES TO THE RUBBER INDUSTRY AND STOCK POINTS:

AKRON, OHIO, Akron Chemical Company
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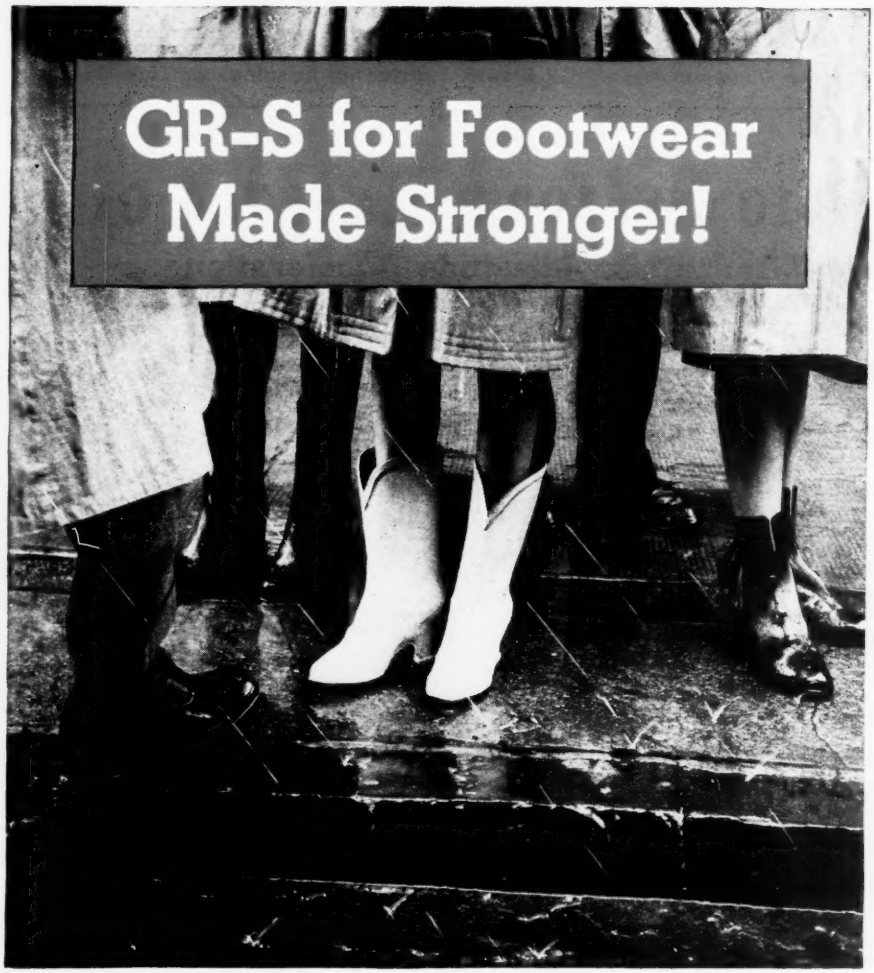


New S/V Sovaloids H and W Improve Resistance to Abrasion . . .

In processing GR-S for footwear or for other products requiring high resistance to abrasion, be sure to plasticize your compounds with S/V Sovaloids H or W.

These new Socony-Vacuum products not only improve the tensile strength, abrasion resistance and aging qualities of vulcanizates, but they're also easier to handle . . . provide smooth processing and easy calendering. You get good dispersion of the carbon black.

Let your Socony-Vacuum Representative give you complete facts about these special plasticizers and assist you in applying them to your individual needs.

Process Products
SOCONY-VACUUM

INVESTIGATE
SOCONY-VACUUM
PROCESS PRODUCTS
Research and Service

Better, Lower-Priced PROCESSING for all types of RUBBER

GR-S PROCESS AID
S/V Sovaloid C
Assists compounding, speeds handling.

GR-S PLASTICIZERS
Special Process Oils
Extend GR-S, produce durable compounds.

LOW TEMP. FLEXIBILITY
S/V Sovaloid L
Retards stiffening of Neoprene.

NEOPRENE SOFTENER
S/V Sovaloid N
No "blooming," even with large amounts.

SUN-CHECK WAX
S/V Product 2243
Prevents surface cracking on natural and GR-S compounds.

SPONGE RUBBER
Special Petrolatum Emulsion
Assists manufacture of Neoprene sponge.

GENERAL PROCESS AID
S/V Sovaloid A
Assists compounding GR-S and Neoprene.

SOCONY-VACUUM OIL CO., INC.
26 Broadway, New York 4, N. Y.,
and Affiliates:
Magnolia Petroleum Company,
General Petroleum Corporation.

Tune in "Information Please"
Monday Evenings, 9:30 E.D.T.—NBC

Technical Bulletin No. 22 — on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

GR-S and GR-S-10 with 100 Parts of Zinc Oxide

"Santocure" Benzothiazyldisulfide Acceleration

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness	Tear Resistance Tested at: Room Temp.	100°C.
GR-S										
7.5	1195	820	125	165	250	290	.35	40	66	38
15	1870	650	205	285	450	690	.33	50	62	33
30	1460	595	230	310	460	770	.28	50	62	29
45	1515	590	235	310	465	775	.27	50	59	28
60	1360	590	235	310	425	740	.25	50	62	25
90	1490	620	195	275	430	625	.27	50	59	28
GR-S-10										
30	2240	930	160	240	320	400	.36	40	75	38
45	1280	695	200	280	360	520	.22	43	77	34
60	1680	745	200	280	400	520	.28	45	71	34
90	1510	690	200	275	395	555	.21	45	70	32
120	1530	730	240	285	360	525	.24	45	74	33

Time of Cure Min. at 45 Lb.	Goodyear-Healey Pendulum: Indentation in mm.	Per Cent Rebound	Shore Hardness	Compression Fatigue (Goodrich Flexometer)*: Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise °C.	Dynamic Compression: Initial	Final	Cut-Growth Resistance Tested at 70° C. Inches Failure: 100 Cyc.	1,200 Cyc.
GR-S										
90	7.92	62.5	50	27.7	40'-38.7	106.5† (at 15'-50.5)	17.4	42.9	.14	.65
GR-S-10										
120	7.94	52.8	44	35.1	B.O.†-30'	106.5† (at 15'-64.0)	23.9	48.5	.03	.21

* Test Conditions: 143 Lb. Load. 0.175" Stroke. 100° C. Oven Temp. † Blow Out.

IN THE reports on the German Tire Industry some rather unusual accelerator combinations were noted in carcass stock formulations. "Vulcacit AZ," which is said to be similar in action to "Santocure," was widely used, and in one case it was employed with Benzothiazyldisulfide. German compounding practice called for 20-50 parts of Zinc Oxide on the polymer in truck tire carcass stocks. Using the German acceleration and sulfur ratios, the following results were obtained with 100 parts of Zinc Oxide. The compounds are interesting in that flat-curing stocks are obtained, which show a definite reversion tendency in the case of GR-S. The pendulum rebound and heat generation could probably be improved by increasing the sulfur content. In the case of slower-curing GR-S-10, an increase in the acceleration and sulfur content is indicated which would probably result in a substantial improvement in heat generating properties.

COMPOUND No. 22

GR-S	100.0	
GR-S-10 (Rosin Soap Polymer)		100.0
Sulfur	2.37	2.37
Santocure	0.84	0.84
Benzothiazyldisulfide	0.31	0.31
Coumarone-indene Resin	7.5	3.0
E. L. C. Magnesia	5.0	5.0
Zinc Oxide	100.0	100.0

Uniform Quality
HORSE HEAD ZINC OXIDES

THE NEW JERSEY ZINC COMPANY
160 FRONT STREET • NEW YORK 7, N. Y.
Products Distributed by **THE NEW JERSEY ZINC SALES COMPANY**
NEW YORK • CHICAGO • BOSTON • CLEVELAND • SAN FRANCISCO

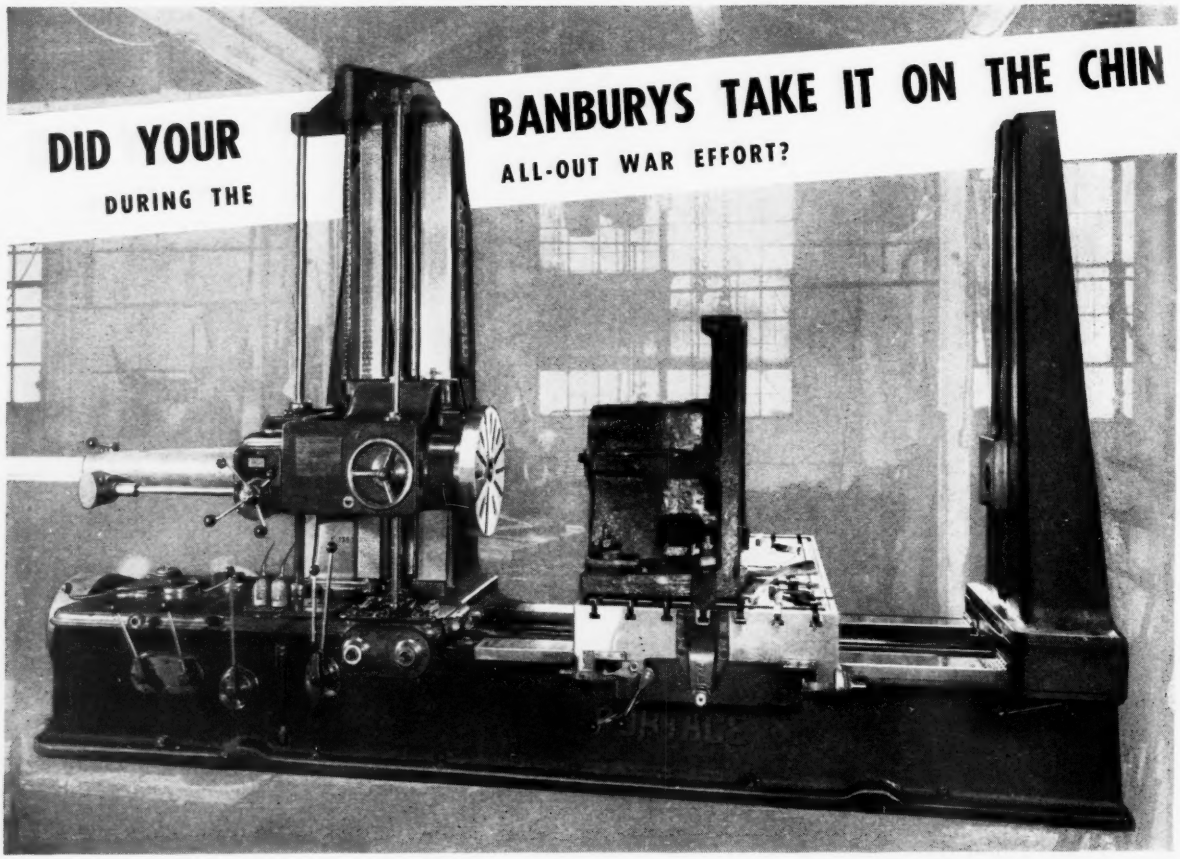
it's your move to Color...

THE RETURN of red tubes from war-time oblivion is setting the pattern for *moves to color* in many directions... In Drug Sundries, Mechanical Goods, and Footwear, COLOR will stimulate the change to stable peace-time markets . . . The return of white side-wall tires is a looming event for 1946 . . . In all of these production trends SILENE EF is a dominant factor because it is assuring greater success in color compounding . . . SILENE EF is essential in many non-black compounds of natural or synthetic rubber to give them the needed processing and good cured physical properties unobtainable when whitings or clays are used alone as the loading pigment.

SILENE EF

STANDARD Chemical Company
General Offices: AKRON 8, OHIO

New England: 335 Chamber of Commerce Bldg., Boston, Mass.
Mid-Atlantic: Broad Street Bank Bldg., Trenton, N. J.
Mid-West: 2724 W. Lawrence Ave., Chicago, Ill.
Pacific Coast: 1248 Wholesale St., Los Angeles, Cal.



If so—just turn your troubles over to INTERSTATE, the only plant devoted exclusively to expert, rapid and complete Banbury Mixer rebuilding.

Banburys bore the brunt of battle in the production of many vital materials which made Victory possible. Working night and day, without let-up, many a Banbury, today, is a casualty of the all-out effort, its efficiency far below par.

In the face of increasing production schedules, are YOU confronted with possible Banbury breakdowns? You know how costly that can be! Don't take any chances. Let INTERSTATE repair, or, rebuild your Banburys before it's too late. We'll send 'em back ALIVE, yes, as good as NEW, all set to take their places in the peace-time production line.

You can bank on that, because, here at INTERSTATE, we have the KNOW-HOW and we're equipped, as no other plant, with FACILITIES PLUS, to put war-weary Banburys back on the beam.

An example of INTERSTATE'S FACILITIES PLUS is pictured above. Here you see a Number 9 end frame in one of our horizontal boring machines which guarantees absolute precision work.

That's the way we do things at INTERSTATE. If we can be of help, wire, write or phone us today!

Address: 914 Miami Street, Akron, Ohio Phone: Jefferson 7970

SERVING THE RUBBER INDUSTRY

INTERSTATE WELDING SERVICE

Main Plant AKRON, OHIO

EXCLUSIVE SPECIALISTS IN BANBURY MIXER REBUILDING

INVESTIGATE Sharples VULTACS

IN GR-S OR GR-S-NATURAL RUBBER TIRE TREADS

FOR IMPROVEMENT OF:

- RESISTANCE TO FLEX-CRACK GROWTH...
- RESISTANCE TO TEAR...
- RETENTION OF ORIGINAL PROPERTIES AFTER AGING...

Further information will be gladly supplied upon request.

SHARPLES TRADE MARK CHEMICALS

SHARPLES CHEMICALS INC. PHILADELPHIA · CHICAGO · NEW YORK

For Cooler-Running Tires...
Compound GR-S-10 *with* RED LEAD

Here's how you can take full advantage of GR-S-10, the new rubber with improved tack for your tires.

Use #2 RM Red Lead in combination with thiazole and thiuram accelerators. The result is a safer, cooler running tire of improved heat stability. In addition the #2 RM Red Lead assures a practical rate of cure and an extended curing range.

It is effective, efficient and economical.

Two formulas are shown. The accompanying data indicate how the addition of #2 RM Red Lead in Formula "B" helps produce cooler-running, safer tires... tires that last longer, and whose superior balance of original properties is well maintained throughout their service life.

Further information will be supplied upon request to the Rubber Division of our Research Laboratories, 105 York Street, Brooklyn, N. Y.

COMPOUND GR-S-10 WITH RED LEAD FOR THESE 6 GOOD REASONS:

1. Improved Heat Stability —retention of elasticity
2. Lower Heat Build-up — Cooler Running
3. Faster Curing Rate
4. Extended Curing Range
5. Excellent General Physical Properties
6. Safe Processing

FORMULAS

GR-S-10 TREAD STOCK

	"A"	"B"
GR-S-10	100	100
EPC Black	45	45
Zinc Oxide	3.0	3.0
#2 RM Red Lead	—	2.25
Santocure	1.80	—
Thiofide	—	0.65
Thionex	—	0.25
Sulfur	2.00	1.40
Disproportionated Wood Rosin	—	5
Coal Tar Softener	8	3

DATA

Sample	*T/287°F*	*Tensile Strength*	*% Elong.*	*M-300*	*M-500*	*Shore*	*△T, F°[1]*
A	15	no cure					
	20	270	890	0	80	40	
	30	2490	710	600	1500	51	
	45	3000	635	800	1990	55	66.5
	60	2600	580	875	2200	56	64.0
	90	2500	570	920	2140	56	64.0
B	15	2600	870	240	915	50	
	20	2980	790	415	1290	52	
	30	3170	680	710	1800	56	
	45	3110	630	885	2215	57	63.0
	60	3170	630	880	2190	57	60.5
	90	3000	585	930	2350	57	60.5
		Aged 48 Hr. at 100°C					
A	15	no cure					
	20	insufficient cure					
	30	1600	240	....	....	69	
	45	2060	335	1980	....	68	
	60	2000	340	1700	....	67	
	90	2200	370	1685	....	67	
B	15	2520	395	1730	....	66	
	20	2800	475	1550	....	65	
	30	2725	465	1620	....	65	
	45	2700	450	1660	....	65	
	60	2780	450	1660	....	65	
	90	2620	430	1530	....		

[1]*Goodrich Flexometer at 20°C, Load 100 psi, Stroke, 20%*

NATIONAL LEAD COMPANY

New York 6; Buffalo 3; Chicago 80; Cincinnati 3; Cleveland 13; St. Louis 1; San Francisco 10; Boston 6, (National Lead Co. of Mass.); Philadelphia 7, (John T. Lewis & Bros. Co.); Pittsburgh 30, (National Lead Co. of Pa.).

Go Ahead with High Loadings
...USE WITCO SOFTENERS

It's the green light for high loadings when you use Witco Softener #20. The plasticizing and lubrication of stiff, heavily loaded stocks with Witco Softener #20 reduces milling time, permits lower milling temperatures, improves dispersion of carbon black and other pigments and, at the same time, does not materially alter the rate of cure. Witco Softener #9 provides stocks with slightly higher tensile strength and tear resistance than is obtainable with ordinary softeners and still maintains good plasticization and pigment dispersion.

WITCO CHEMICAL COMPANY
MANUFACTURERS AND EXPORTERS
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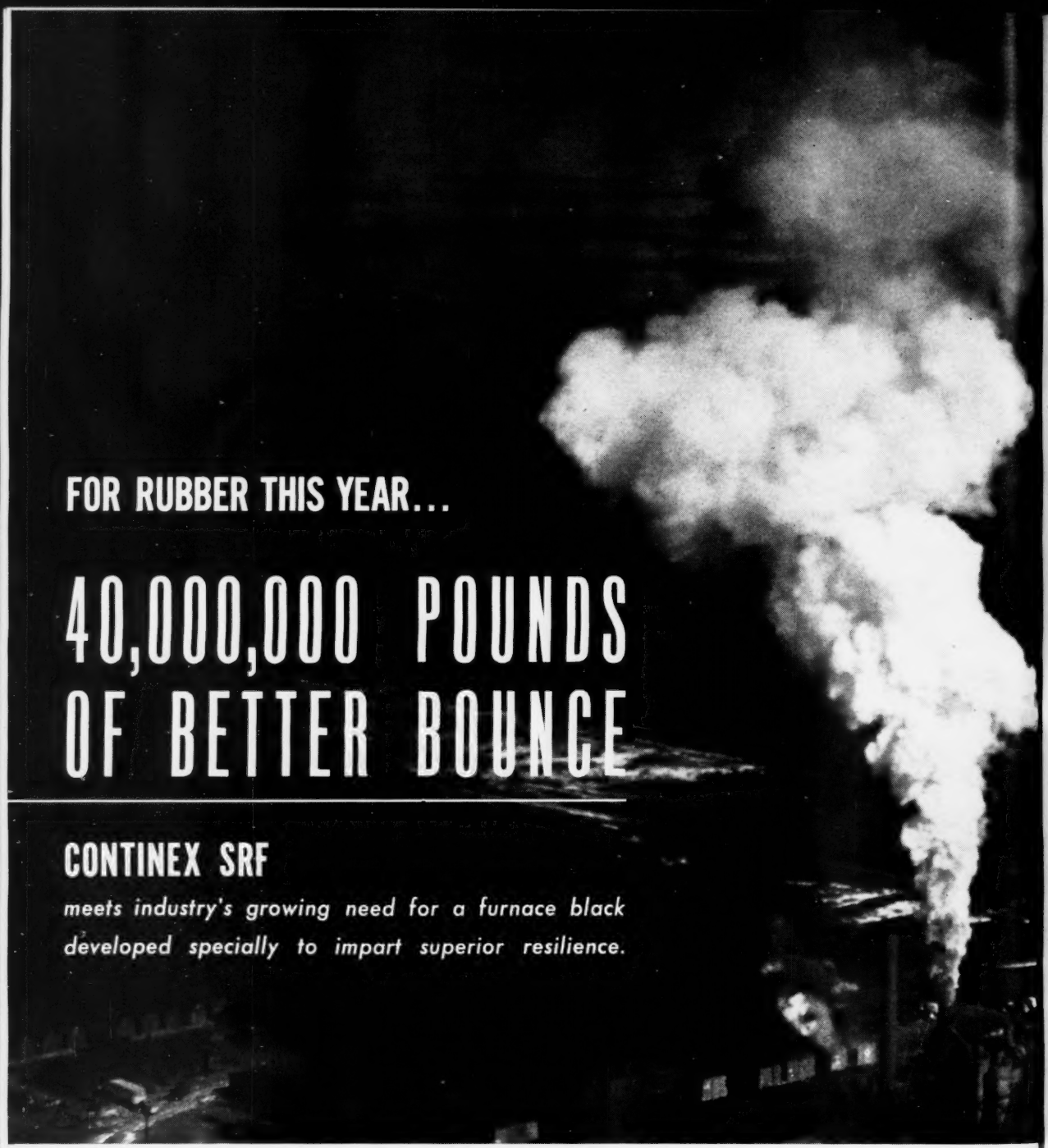

FOR RUBBER THIS YEAR...

40,000,000 POUNDS OF BETTER BOUNCE

CONTINEX SRF

meets industry's growing need for a furnace black developed specially to impart superior resilience.

● The Continental Carbon Company's facilities at Sunray, Texas, shown above, insure a dependable supply of both furnace and channel blacks produced under rigidly controlled conditions. This assures the rubber manufacturer of uniform quality and makes certain the finished rubber product will possess the correct properties to provide maximum service in the application for which it is intended.

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uniformity makes the big difference

GET MORE SUCCESSFUL FABRICATION WITH THESE MORE UNIFORM FABRICS

Successful fabrication of your rubber products is largely contingent on the degree of uniformity in the fabric you employ. MT. VERNON fabrics *have* this uniformity . . . an undeviating quality attained by a rigid system of laboratory control that checks every step of their production. For fabric uniformity that insures more efficient fabrication of your rubber products, specify MT. VERNON Fabrics.

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Reclaim your synthetic scrap with POLYMEL "6" and POLYMEL "AX"

by cold plasticization

Typical synthetic cured scrap compounds:

COMPOSITION	
GR-S cured scrap	100.0
Butyl cured scrap	10.0
Neoprene scrap	10.0
Polymel plast. No. 6	35.0
Polymel plast. No. 7 liquid	5.0
Zinc oxide	2.0
Cumate	0.3
Sulfur	1.4
Cure 8 min. at	305° F.

PHYSICAL TESTS

Shore hardness	**72**
Tensile	**908 p.s.i.**
Elongation	**295%**
Per. set at break	**18%**
Material cost	**0.0237 cts. a lb.**

COMPOSITION		
GR-S cured tire tread	100	100.0
Plasticizer Polymel No. 6	30	30.0
Curative master batch	13	.....
Total	143	
MASTER BATCH		
GR-S rubber	67.0	6.7
Philblack A	28.5	2.85
Zinc oxide	20.0	2.0
Sulfur	12.0	1.2
Cumate	2.5	0.25
Totals	130.0	143.0
Cure 8 min. at		307° F.

PHYSICAL TESTS

Shore hardness	**67**
Tensile	**1080 p.s.i.**
Elongation	**365%**
Per. set at break	**16%**
Material cost	**0.0462 cts. a lb.**

COMPOSITION	
GR-S cured scrap	100.0
Polymel plast. No. AX	20.0
Zinc stearate	0.5
M.B.T.S.	0.8
Sulfur	1.0
Cure 8 min. at	307° F.

VULCANIZATION TESTS

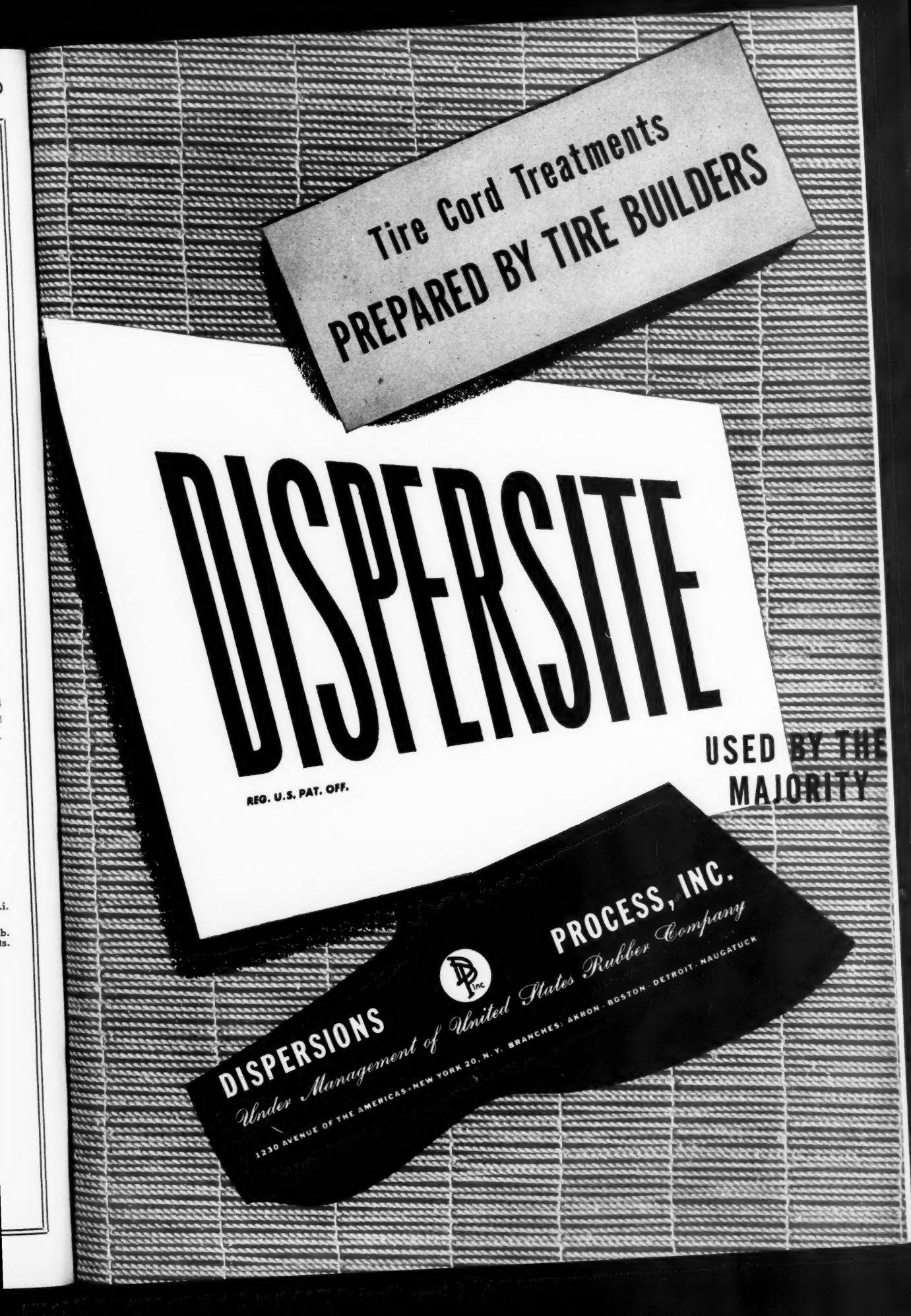
Shore hardness	**70**
Tensile strength	**745 p.s.i.**
Elongation	**250%**

Cost of material 0.0221 cents a lb. based on crude scrap at 0.0125 cts. a lb.

For further data, please write

THE POLYMEL CORPORATION

LINCOLN BOULEVARD MIDDLESEX, NEW JERSEY


Tire Cord Treatments
PREPARED BY TIRE BUILDERS
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REG. U.S. PAT. OFF.
USED BY THE MAJORITY
DISPERSIONS
PROCESS, INC.
Under Management of United States Rubber Company
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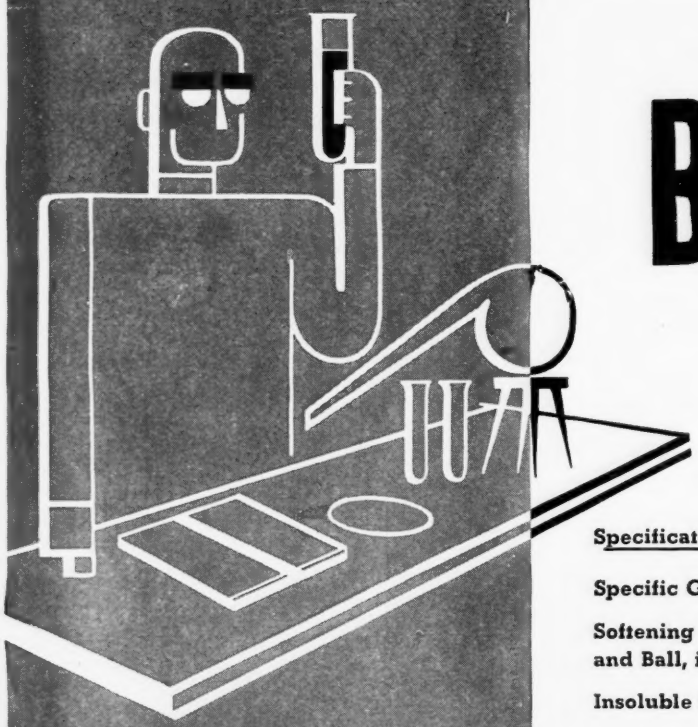
FROM THE CATALOG OF BARRETT RUBBER COMPOUNDING MATERIALS...



B.R.C.*

NO. 20

B.R.C. No. 20 is a solid hydrocarbon derived from Coal Tar.

Specifications

Specific Gravity	1.25 to 1.32 @ 25°C/25°C
Softening Point, Ring and Ball, in Glycerine	175 to 185°F
Insoluble in Carbon Disulfide	15.0 to 25.0% by weight

B.R.C. No. 20 is an inexpensive solid type softener which can be used to advantage in the design of many compounds. It is a reinforcing plasticizer and tends to impart good processing characteristics, especially in highly loaded low-cost compounds.

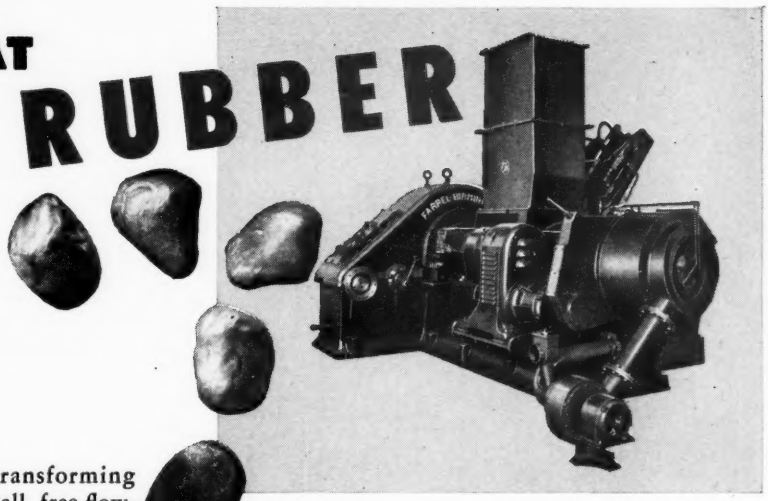
*Reg. U.S. Pat. Off.

Barrett

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

In Canada: The Barrett Company, Ltd.,
5551 St. Hubert Street, Montreal, Que.

6 WAYS THAT PELLET RUBBER STEPS UP MILL ROOM EFFICIENCY



Here's a machine that, by transforming bulky, hard-to-handle rubber into small, free-flowing pellets, makes possible lower-cost, higher-efficiency mill-room layouts such as the one shown in the diagram.

Here are six processing advantages that you get from a pellet rubber system:

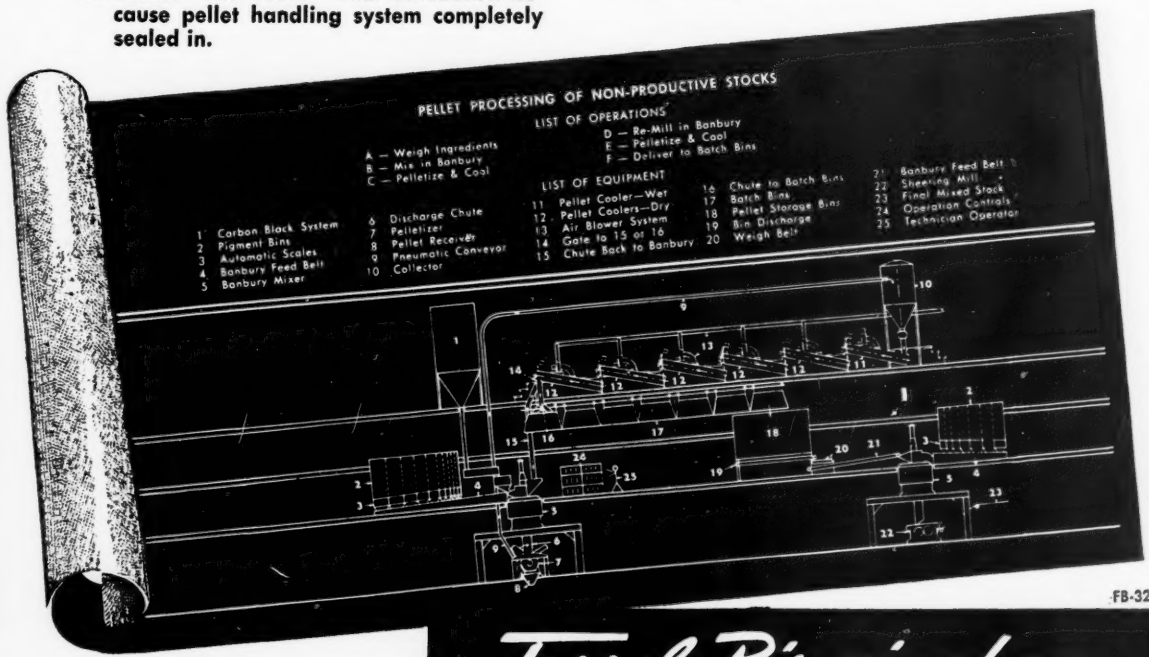
1. **Manual handling reduced by automatic conveying, weighing and mixing.**
2. **Increased production—Banbury mixing cycle reduced.**
3. **Greater ease of mixing and blending rubber pellets improves uniformity and quality of finished product.**
4. **Pellets thoroughly cooled more quickly—reduces time between processing operations—less stock in process.**
5. **Less floor space required — floor storage and trucking eliminated.**
6. **Cleaner mill room — dust eliminated because pellet handling system completely sealed in.**

The Hale Pelletizer itself is an extruding machine with a screw which forces the rubber up to the pelletizing head where the pellets are formed. These pellets are lightly coated with soapstone before leaving the machine to prevent sticking together.

You can get complete information and engineering help on the pelletizer and pellet rubber system by sending us a request on your letterhead. No obligation, of course.

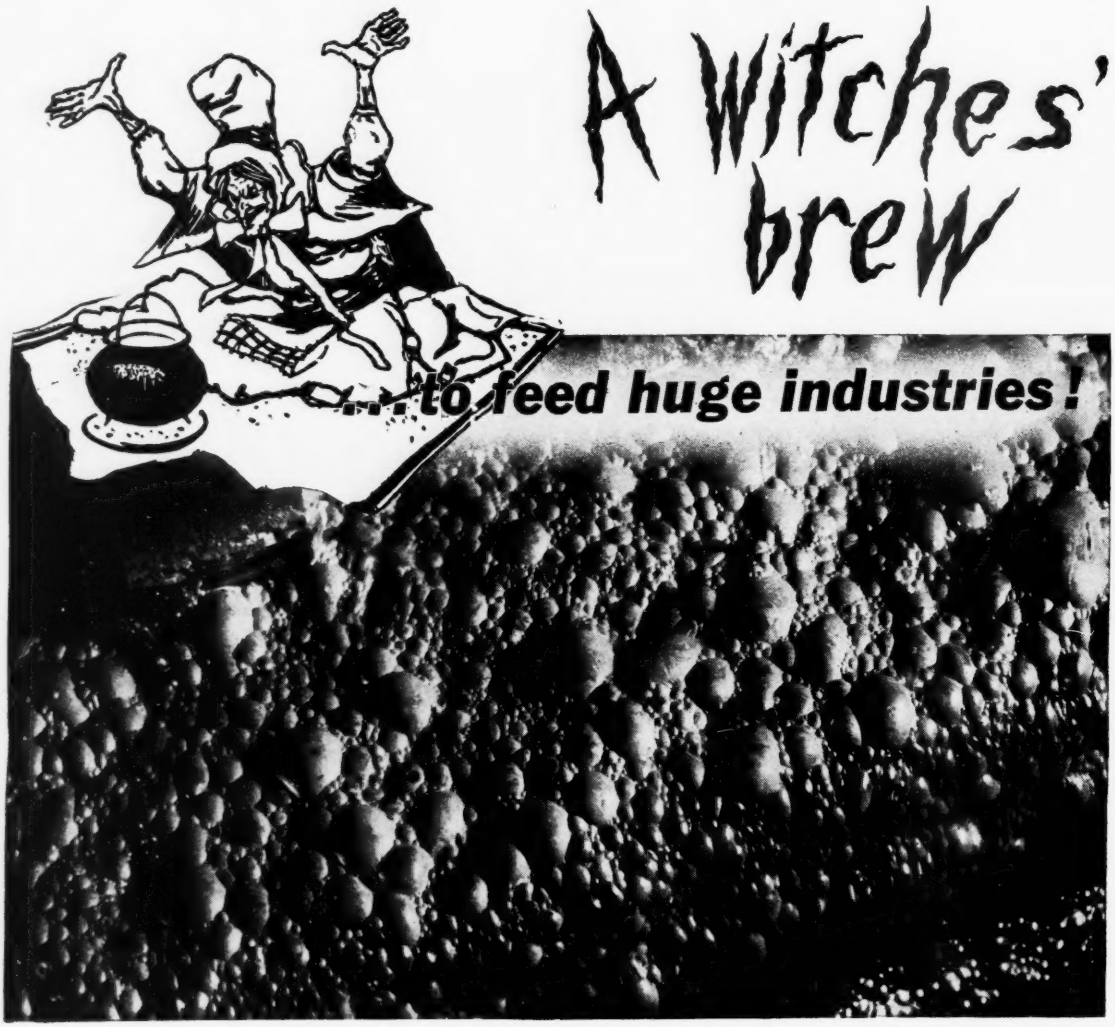
FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: **Ansonia, Derby and Stonington, Conn., Buffalo, N. Y.**
Sales Offices: **Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles, Tulsa, Houston, Charlotte**



FB-323

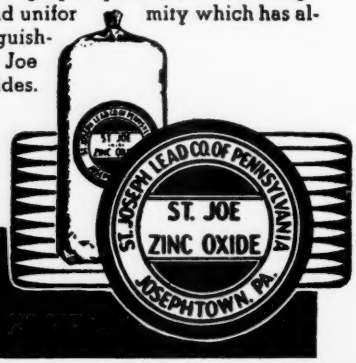
Farrel-Birmingham



Bubble crowds bubble in this agitated and constantly overflowing brew. The fact that no heat is reflected from this seemingly boiling mass, evokes visions of witches mumbling incantations over mysteriously bubbling cauldrons.

● In reality, the picture shows a section of a flotation tank in the Balmat mill of the St. Joseph Lead Company's zinc mines in northern New York State. The flotation process is one of the first steps in the production of St. Joe lead-free Zinc Oxides for the huge industries engaged in the manufacture of rubber, paint and other zinc oxide-containing products. The bubbles emanating from the roiling liquid, rise from the bottom of the huge tank containing zinc ore. This has previously been crushed and ground to the size of sand which is mixed with water and precisely controlled combinations of chemical reagents. Besides zinc, the pulp contains lead and iron pyrites, it is agitated in the flotation machines by forcing air to the bottom of the tank. The first combination of chemical reagents makes the lead sulphide adhere to the bubbles and overflow at the top, the next combination "floats" the zinc sulphide, and the final circuit "floats" the iron pyrites concentrates.

After filtering and drying, the zinc concentrates, averaging 57% zinc, are shipped to the Company's Josephtown, Pa. smelter where they are converted into zinc oxide by a patented electro-thermic process. The flexibility of this process—exclusive with this Company—is largely responsible for that high degree of purity and uniformity which has always been a distinguishing feature of St. Joe lead-free Zinc Oxides.



ST. JOSEPH LEAD COMPANY

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ST. JOE *Lead-Free* ZINC OXIDE

MADE BY THE LARGEST PRODUCER OF LEAD IN THE UNITED STATES

ORDER
OUT OF Chaos
That was the result when, early in this century, we promoted systematic grading and specifications for
SCRAP RUBBER
WE ARE STILL MAINTAINING
Leadership Through Ability and Stability
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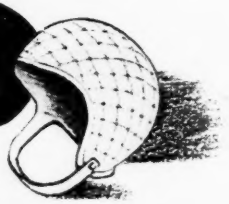
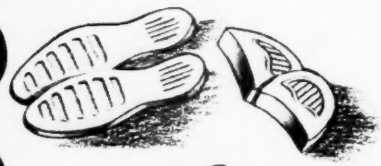
TITANOX...



the right choice for WHITE products



In natural or synthetic rubber, TITANOX imparts a whiteness that adds attractiveness and sales-appeal to products. A little of it goes a long way in accomplishing high whitening and strong brightening with a minimum of pigmentation.

TITANOX is effective, not only for white rubber but also for tinted stocks to which it brings tones and colors that are remarkably clear.

The good working qualities of TITANOX have resulted in a demand much greater than the output. So, if you can't get all the TITANOX you want, please bear with us. In the meantime, everything possible is being done to increase production.

TITANOX

TRADE MARK

TITANIUM PIGMENT CORPORATION
SOLE SALES AGENT

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You're looking at a cone of precision wound rayon tire cord that weighs more than 18 pounds—the largest ever produced. Never before was there so colossal a cone of rayon.

It came into being because a tire manufacturer needed it to maintain maximum operating efficiency in feeding cord into the latex bath. Smaller cones would have required more frequent replacements.

To produce these huge cones of strong, knotless Tyron cord, many ingenious adaptations of existing machinery were necessary. Thanks to the "know how" and perseverance of Industrial's engineers, this and many other new developments have been added to the growing list of Industrial's chemical, mechanical and textile achievements.

Just look over these accomplishments! CONTINUOUS PROCESSING and its adaptation to REEL SLASHING of tire yarn; LEKTROSETTING, the electronic method of setting twist in tire cord; UPTWISTING of yarn to produce cord; MULTIPLE BEAM WEAVING of tire cord fabric. They represent the kind of thinking and the kind of doing that is available for your needs now that Uncle Sam no longer wants first call.

It's called **GIANT CONING** Remember it!

Industrial RAYON CORPORATION
CLEVELAND, OHIO
NEW YORK OFFICE 500 FIFTH AVE

MAKERS OF

*Spun-lo RAYON YARN AND CLOTH and *TYRON YARN, CORD AND FABRIC

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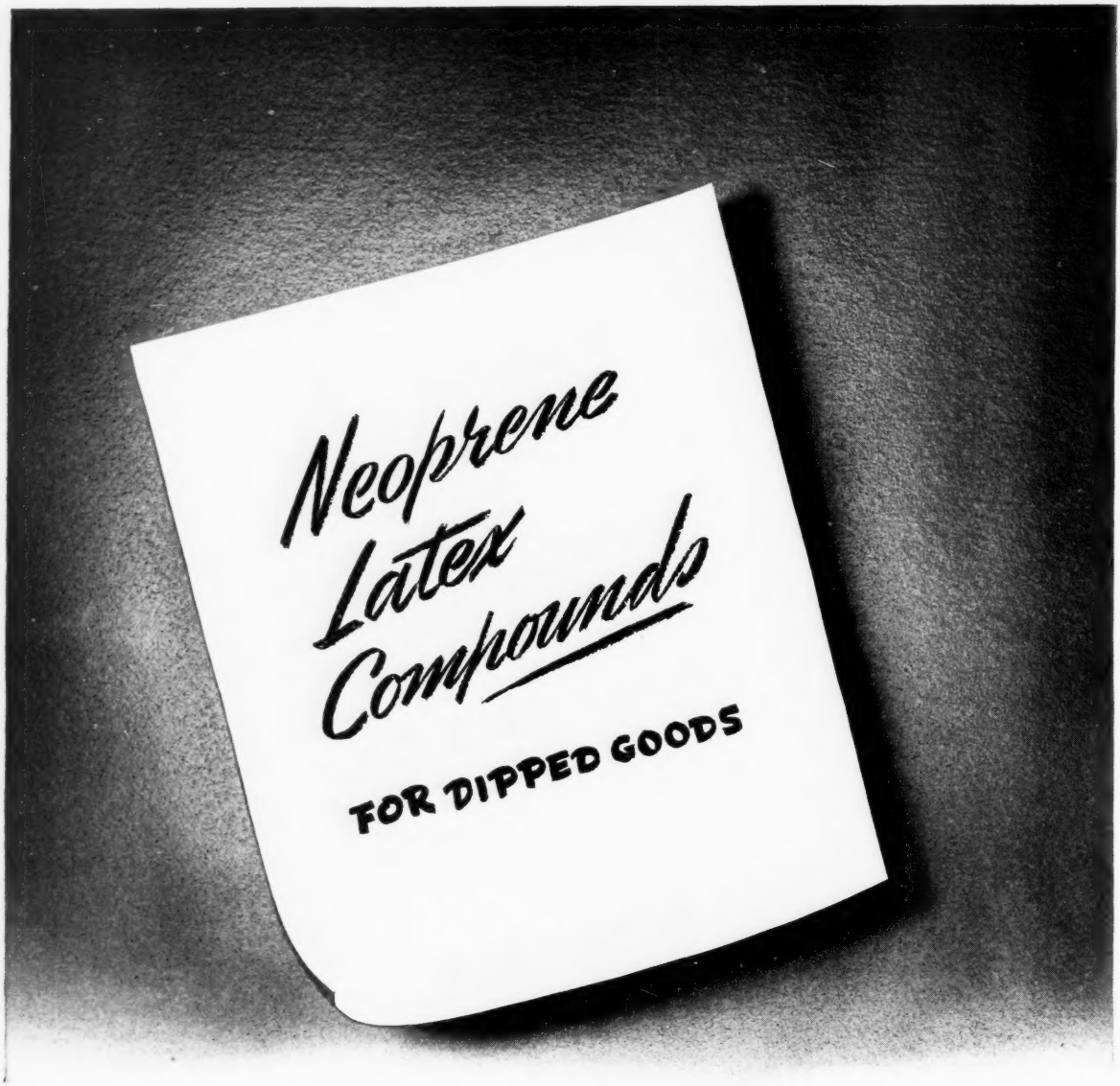


General Latex has developed several simplified neoprene latex compounds for dipped goods. These compounds are thoroughly "tried and proven" and in current use in many factories. Neoprene latex offers advantages not found in natural rubber latex—more particularly, high resistance to oxidation, sunlight, oils, and chemicals. If you are considering the manufacture of any dipped product, we suggest that you get in touch with our technical staff. Their years of experience with natural and neoprene latex will prove very helpful in formulating a neoprene compound custom-made to your specific needs.

General Latex
& CHEMICAL CORP.
666 MAIN STREET, CAMBRIDGE, MASS.

Vultex Division — Verdun Industrial Buildings, Verdun, Montreal, Quebec

Agents for Rubber Reserve Company for storage and distribution of natural rubber latex. Distributors for Rubber Reserve Company for synthetic latex. Operators of the Government owned Baytown, Texas, synthetic rubber plant in collaboration with the General Tire & Rubber Co.

Yes, or alike as two telephone handsets made by the same process. Yet, pins or handsets — no two could ever be made exactly alike. Dimensions, weight, performance — all vary every time due to variables in manufacture. How can these variables be *controlled?*

Back in 1924, Bell Laboratories' mathematicians and engineers teamed up to find out, forming the first group of quality-control specialists in history. They invented the now familiar Quality Control Chart, designed inspection tables for scientific sampling. They discovered that test data mathematically charted in the light of probability theory were talking a language that could be read for the benefit of all industry. Western Electric, manufacturing branch of the Bell System, applied the new science to its large-scale production. In war, it was used by industrial and government agencies of the United Nations in establishing and maintaining standards for military matériel. A Quality Assurance Department, a novelty back in the nineteen-twenties, has come to be indispensable to almost every important manufacturer.

Scientific quality control is one of many Bell Laboratories' ideas that have born fruit in the Bell System. The application of mathematics to production helps good management all over the industrial world — and furthers the cause of good telephone service.

BELL TELEPHONE LABORATORIES

EXPLORING AND INVENTING, DEVISING AND PERFECTING FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE.

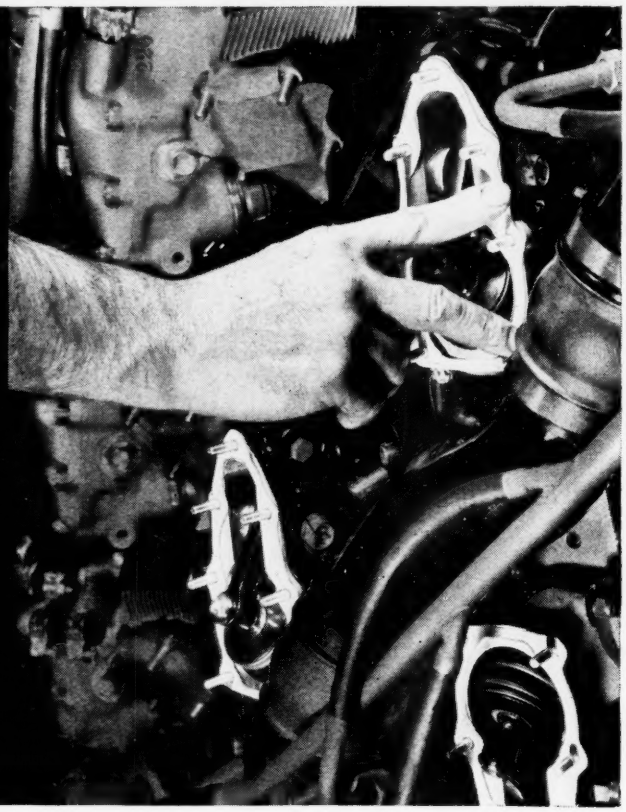
DC
DOW CORNING
SILICONES

SILASTIC
FLUIDS
VARNISHES
RESINS
GREASES

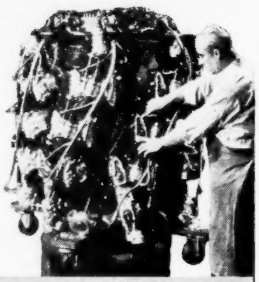
withstand heat
resist oxidation
exclude moisture

SILASTIC* GASKETS

for the
most powerful aircraft
engine ever built!



chosen best among all gasket materials tested for service at 450°F.



Silastic gaskets fabricated from Dow Corning silicone rubber by the Connecticut Hard Rubber Co. seal 56 rocker boxes of the 28-cylinder Pratt & Whitney Wasp Major.

"NOTHING BUT THE BEST!" That's the policy followed by Pratt & Whitney in selecting materials for the powerful new 28-cylinder, 3650 h.p. Wasp Major.

That's why Silastic was chosen for these rocker box gaskets. Factors in the choice were Silastic's resiliency at the 450°F. operating temperature, resistance to the hot oil, and convenience in handling.

Silastic will fly with the Wasp Major in such giant new airliners as the Boeing Stratocruiser, Douglas Globemaster, Martin Mars, and Republic Rainbow.

If you need a rubber-like material that's resilient up to 500°F. and flexible down to −70°F., call for "Silastic Facts" No. 1A—and *TRY SILASTIC!*

*Trade Mark, Dow Corning Corporation

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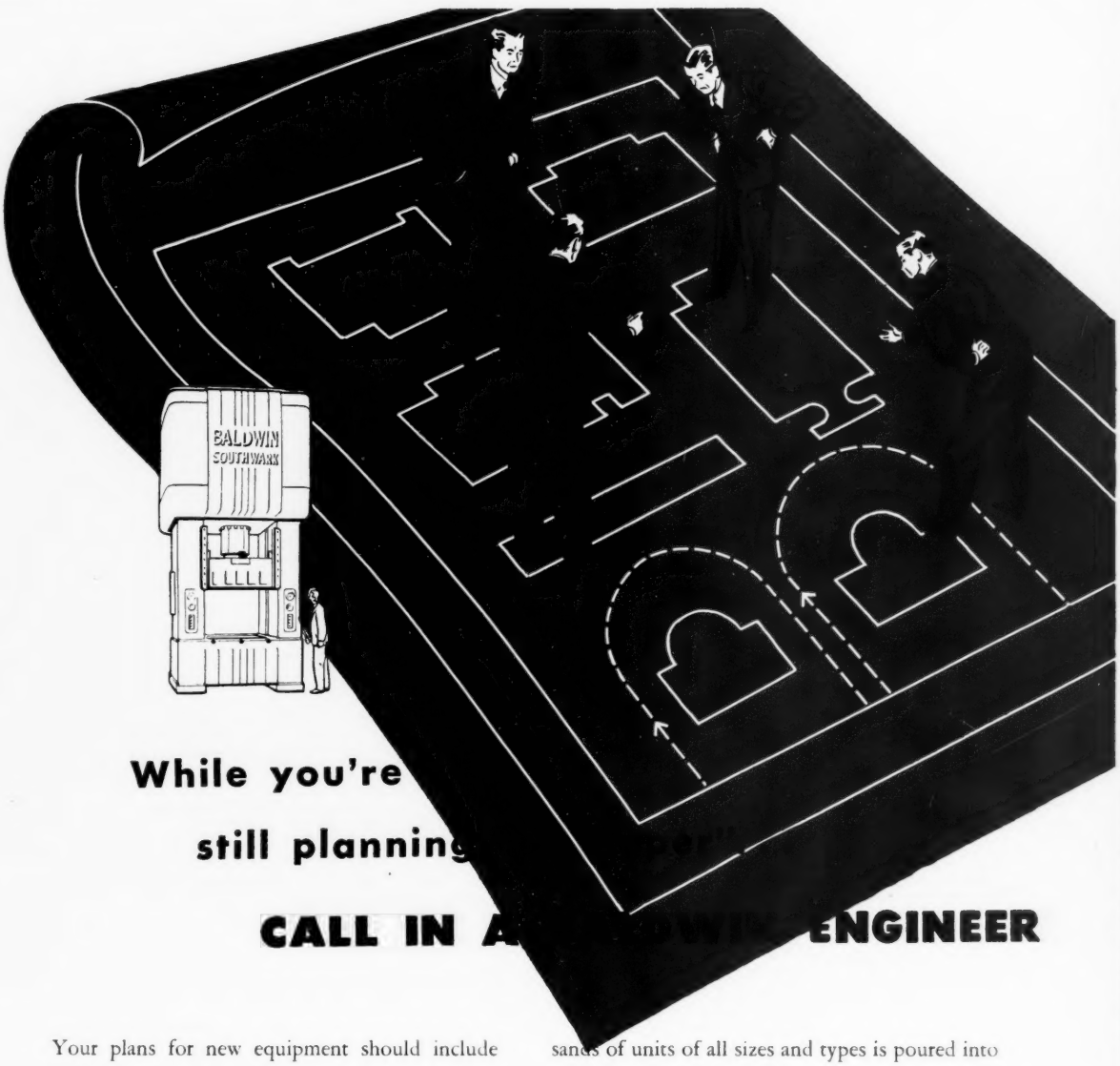
Dow Corning
FIRST IN SILICONES



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still planning

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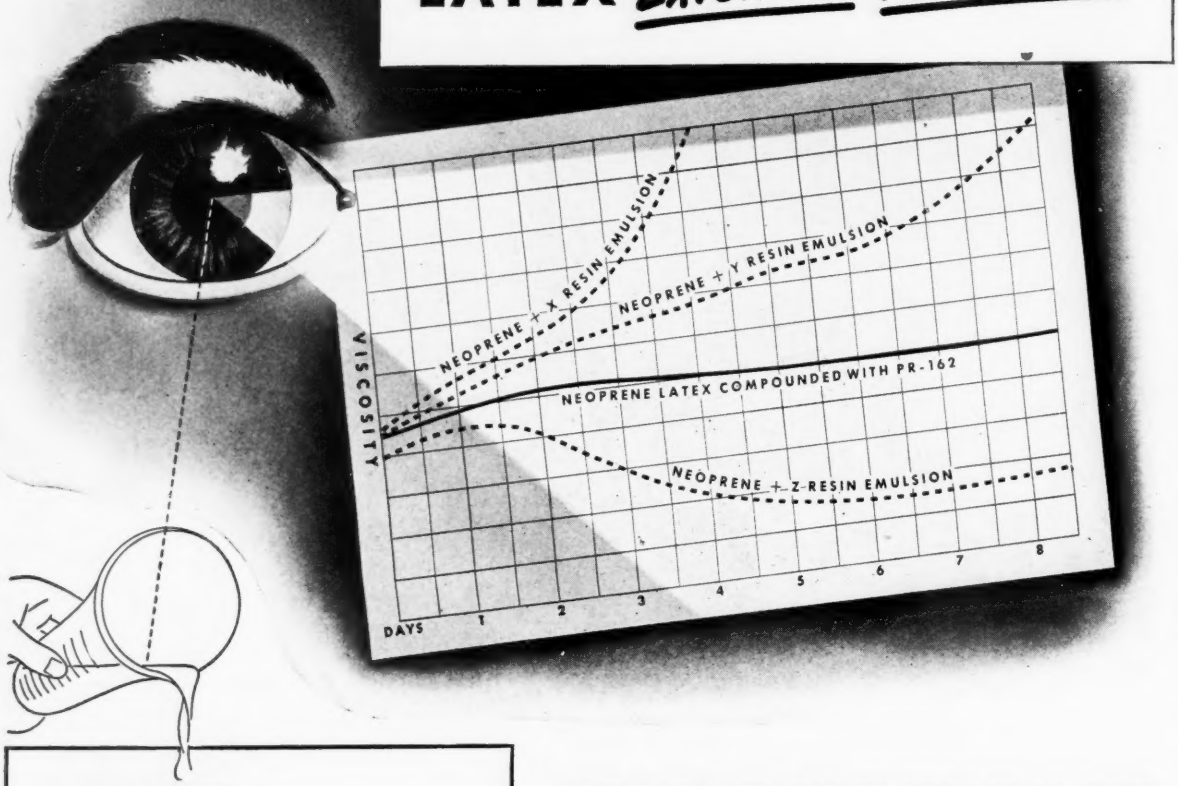

FACTS ABOUT PR-162

1. Is a stabilized emulsion of a special modified resin, of uniform and constant viscosity, which may be freely diluted with water (color of film when water has evaporated is clear, light amber).
2. Is ideal for extending and tackifying Neoprene Latex types 571, 572, and 571 concentrated (Also may be used with GR-S Type 3 or natural latex).
3. *Produces strong Neoprene Latex adhesives possessing building tack and pressure-sensitivity (dry tack) from a few hours up to 4 or 5 days, as desired.*
4. Resultant mixes are mechanically stable: may be brushed on or will run in most machines without coagulation (In machines where foaming usually is a problem, suitable anti-foams can be supplied on request).
5. Where permanence is required, proper treatment with anti-oxidants will result in excellent ageing in service and under accelerated ageing conditions (Suitable anti-oxidants can be supplied upon request).
6. Formulations of Neoprene Latex and PR-162 can be compounded in your own equipment or UBS will compound and ship the formulated adhesive to you.

TESTS SHOW UBS FORMULATION PR-162 GIVES MORE UNIFORM AND CONSTANT VISCOSITY

As the above graph illustrates, many Extender-Tackifier dispersions, when compounded with Neoprene Latex, show unstable viscosity tendencies as compared with UBS formulation PR-162. Users find the more uniform and constant viscosity of PR-162 an extremely important advantage in compounding Neoprene Latices.

The product of many years of practical experience with Neoprene, PR-162 is an original development of the UBS Laboratories. Write today for complete Data Sheet. Address your inquiry to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard Street, Cambridge 42, Massachusetts.

For masking the basic odor of Neoprene Latex, we suggest using UBS Masking Perfume—Formula D6.

UBS

Serving Industry with Creative Chemistry

UNION BAY STATE *Chemical Company*

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2. ADEQUATE SOURCES OF POWER
3. OPPORTUNITY FOR DECENTRALIZATION
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9. INCREASING INDUSTRIAL DEVELOPMENT
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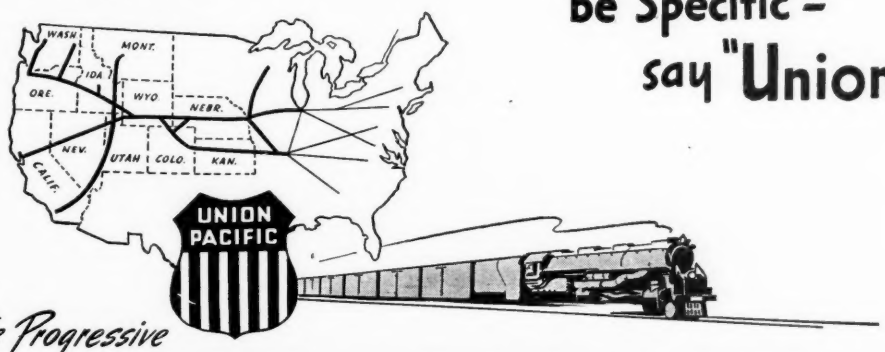

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UNION PACIFIC RAILROAD

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- **ARROW-TX** Medium-processing Channel Black (MPC)
- **HX** . . . . . Hard-processing Channel Black (HPC)
- **MODULEX** . High-modulus Furnace Black (HMF)
- **ESSEX** . . . . Semi-reenforcing Furnace Black (SRF)

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- **PARAGON** . Soft Clay
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J. M. HUBER, INC.

460 West 34th Street

NEW YORK 1, N. Y.

June, 1946

Volume 114 Number 3

A Bill Brothers Publication

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NATURAL & SYNTHETIC

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NATURAL & SYNTHETIC

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The Author

Synthetic Rubber Situation[1]

A. E. Boss[2]

AFTER hearing about the natural rubber situation, it seems appropriate to start with a review of synthetic rubber production and demand figures. Table 1 is from a paper KixMiller and I had in the February 10 issue of *Chemical & Engineering News* which brings the picture up to the end of 1945. You will note this includes figures on natural and reclaimed rubber. Table 2 overlaps Table 1 in that it starts at the end of August, 1945, and shows month-end inventories of GR-S in the hands of Rubber Reserve and also total domestic stocks. March and April are estimates.

TABLE 2. GR-S INVENTORIES AT MONTH END
(All Figures in Long Tons)

Month	Office of Rubber Reserve	Total
August, 1945	127,257	193,353
September, 1945	141,354	206,616
October, 1945	134,889	192,294
November, 1945	122,083	180,190
December, 1945	103,993	170,571
January, 1946	81,736	146,743
February, 1946	56,050	124,127
March, 1946	31,531	ca 90,000
April, 1946	ca 15,000	ca 75,000

Present estimated demand figures for GR-S for 1946 amount to 679,000 tons. The best production currently hoped for is 615,000 tons because of limited butadiene supply. From petroleum there is available only enough butadiene for about 550,000 tons of GR-S. Any more has to come from alcohol, and under present world conditions we can hardly use grain for alcohol for butadiene for GR-S. This GR-S production may be raised very slightly, as I shall mention later, but may be lowered by any interruption of butadiene supply. Export commitments call for only 64,000 tons of GR-S in 1946, of which some 40,000 tons were shipped in the first quarter.

[1] Presented before the New York Rubber Group, New York, N. Y., May 3, 1946.

[2] Manager, pigment sales, Columbia Chemical Division, Pittsburgh Plate Glass Co., formerly manager, Research and Development, Office of Rubber Reserve, RFC, Washington, D. C.

TABLE 1. RUBBER SUPPLY AND DEMAND
(All Figures in Long Tons)

	GR-S	GR-I (Butyl)	GR-M* (Neoprene)	N-Types†	Total Synthetic	Reclaimed Rubber	Crude (Natural) Rubber	Grand Total
1944 production (or receipts)	679,949	20,252	56,660	16,812	773,673	260,631	107,834	1,142,138
1944 consumption (including exports)	594,794	11,393	52,146	14,791	672,314	263,000	153,778	1,089,092
1944 ending stocks	116,130	9,892	11,739	5,166	142,927	43,832	93,650	280,409
1945 production‡ (or receipts)	725,000	51,900	45,500	7,900	830,300	242,600	137,100	1,210,000
1945 consumption‡ (including exports)	676,600	43,700	48,400	8,500	777,200	254,100	112,000	1,143,300
1945 ending stocks‡	165,000	18,000	9,200	4,700	196,500	30,000	118,000	346,000

* Includes production of private neoprene plant owned by du Pont.
† Made during 1945 in privately owned plants.
‡ Estimates, based on preliminary figures from various government sources, and not reconciled for inventory and shrinkage losses, etc.

GR-I is currently being produced at a rate of 6,000 tons a month in the two United States plants. Canada produces about 1,000 tons. March consumption was 8,500 tons. Obviously there is not enough GR-I to meet the inner tube demand.

GR-M is being produced and consumed at about 3,000 tons per month. Current stockpile is being held at about 2,000 tons. There is no apparent shortage of raw materials to increase GR-M production up to the capacity of the producing plant.

GR-S latex has been showing a rather phenomenal growth. Table 3 shows shipments for 1944, 1945, January, 1946, February, 1946, March, 1946, and for April and May shows authorizations.

TABLE 3. GR-S LATEX

Year		Shipments (Dry Weight) Lbs.
1944		14,500,000
1945		34,000,000
1946		
	January	3,500,000
	February	3,700,000
	March	4,000,000
	April	4,600,000*
	May	5,400,000*

* Authorizations.

Of this latex, about 60% is Type III, which is 50-50 butadiene-styrene on a rosin soap base. The production of the six experimental high solids latices is growing rapidly, accounting for 7-10% of the GR-S latex business in May.

Special latices are now obtainable with a wide range of particle size, of soap content, and of total solids. The range on particle sizes is from 800Å average to 3500Å; average concentration ranges from 30% up to 65% dry rubber solids content; soap content from 8% down to 1.5% plus stabilizers. GR-S latex has a very considerable cost advantage over natural latex, due to greater simplicity in transportation and handling problems. I have no good idea on how much may eventually be used, but from the figures shown it is apparently not near the peak yet. I have seen some excellent sponge made from GR-S latex, and if any considerable proportion of automobiles adopts sponge rubber seats, the consumption can be very large. It is important to realize that the estimated 900,000-ton-per-year rate of consumption of all rubbers, natural and synthetic, has already been exceeded, and the current rate established last month is about 1,000,000 tons per year.

The Quality of Synthetic Rubbers

So much for statistics. Now the question arises, "How good is this synthetic?"

Many thousand man hours have been consumed discussing this question, and I expect the argument will continue for many more.

Before the war the acrylonitrile rubbers and neoprene were finding a growing market at prices far higher than are now current, and their field of use has been greatly expanded by the war. With the new low prices they will not be replaced by natural rubber in uses where their special properties are useful, and they will be used for many applications where they could not previously be considered.

GR-I has a secure place in inner tubes and for other gas containing functions. Now that most of the processing troubles have been ironed out, it is improbable that Butyl could be replaced by natural rubber unless natural rubber becomes cheaper than GR-I. A recent incident illustrates the situation.

A few weeks ago I was talking with one of my compounder friends, and on inquiring how things were going, I found he had only one trouble. A tube compounder with only one trouble is exceedingly rare, so I inquired further and was told, "Evan, they are making me use natural rubber for large tubes, and I don't like it."

GR-S suffered under a severe handicap during the early part of the war since circumstances made mandatory its use by consumers who were accustomed to the vagaries of natural rubber. It is doubtful if even then GR-S was much more variable than natural rubber. The trouble was it was different and its irregularities were different. As a result, GR-S was blamed for almost any difficulty which arose during those days when the stress of war production and the changeover from civilian to military goods caused inevitable handicaps.

During the past three years the overall quality of GR-S, both in its ease and uniformity of processing and fabrication and in the service and efficiency of end-products made from it, has shown a steady and noteworthy improvement. In the early days GR-S was notably difficult to process, and many complaints were received on non-uniformity. Such complaints have all but vanished, and today GR-S may be processed in a majority of operations at no greater cost than natural rubber. This advance was made possible both by increased uniformity of the GR-S itself and by the development of new techniques by the consumer.

From the end-product standpoint, progress has been similarly rapid. One of the most critical uses is in large truck tires. In an early hot weather tire test on the Government Test Fleet in 1943, in which nine tire companies participated, no group of GR-S truck tires ran more than 5,500 miles. In a similar test in the Summer of 1944, with four participants, the average mileage was about 10,000 miles, with one group averaging more than 22,000 miles. In another similar test in the Summer of 1945, average mileages of 9.00-20 truck tires reached 20,000 miles. Test mileages of more than 35,000 miles have been reached in a number of instances. The improvement is nothing short of remarkable and is a combined effect of better rubber, better compounding, improved processing, and improved construction.

In passenger-car tires it is generally agreed that the S-3 tire, using natural rubber only as cement, now gives performance approximately equal to prewar natural rubber tires. In several cases during the last year GR-S tires have given performance on test fleets superior to top-grade natural rubber tires as produced before the war.

It now appears probable that when natural rubber is again available in quantity, the choice between natural and synthetic in passenger-car types will be made on a basis of cost. The larger the truck tire, the greater the probability of natural rubber being used in greater proportion.

This is not going to solve all the problems, since the prewar natural rubber tire was not perfect either, and it is going to introduce new problems as another recent incident indicates.

In a rubber factory not far from here, one of the vice presidents was showing some visitors through his plant and had approximately the following conversation with his millroom chief on noticing some natural rubber in process.

"Looks good to see real rubber again, doesn't it?" he said.

The foreman replied, "Look, do we have to use this stuff? No two batches are alike. Now with this GR-S, we know where we are; it's really uniform."

Special GR-S Types

One obvious advantage of synthetic products over the natural material is the possibility of making a synthetic particularly fitted for a predetermined end use. A great deal of information has been accumulated on how to change certain characteristics of GR-S by changes in the polymerization formula or procedure. The producers of GR-S and Rubber Reserve are very much interested in making a product better fitted for your use.

Many of these have been made. More will be made as the consuming industry makes known its needs. You are all familiar with the various numbered GR-S's:

GR-S Black is now all made on a lower Mooney base, giving easier processing in the consuming factory.

GR-S-85 is a tough high Mooney rubber for certain cement jobs.

GR-S-10 has better building tack. It is also stickier on mill and calender rolls. For some purposes, then, a blend will give improved tack and still be readily processable.

GR-S-25 (EFED) and GR-S-50 (Stalite) have relatively non-staining stabilizers which makes them of interest in white and light colored goods.

GR-S-20-AC is a low Mooney (40-50) polymer originally designed for GR-S inner tubes and now being used in increasing amounts for blown sponge.

GR-S-65 has low water absorption and has found application in insulating stocks.

All of these numbered GR-S types were originally put out as X-numbers. If an experimental GR-S under an X-number runs to 100,000 pounds for three months, it is ordinarily given a GR-S number. Originally information on the X-numbered polymers was necessarily classified as restricted. Today they are announced each month in INDIA RUBBER WORLD and *Rubber Age*.

Experimental GR-S Types

Some experimental GR-S types which I think may be of special interest to this group are as follows:

X-116-GR-S is polyisoprene which behaves chemically much more like natural rubber. There was a paper on this at the A.C.S. Rubber Division meeting at Atlantic City in April.[3]

X-141-GR-S is an isoprene-styrene copolymer which behaves more like natural rubber with respect to curing and aging. It is prepared on a rosin soap base and should give improved tack and less "marching modulus" than GR-S. There is sufficient isoprene over and above the requirements for Butyl to produce up to 250 tons per month of X-141. This would be additive to the GR-S supply since there is plenty of copolymer capacity and merely a shortage of butadiene.

Another X-number rubber which would increase the supply somewhat is X-245, 50-50 butadiene-styrene copolymer. Since we have plenty of styrene and not enough butadiene, any production of higher styrene copolymer increases the available tonnage. The higher styrene rubbers have better tensile, particularly with non-black pigments, smoother processing, higher freeze point, and higher hysteresis.

A relatively new X-number, X-285, authorized in February, contains a cross-bonding agent; so the polymer is deader processing with low shrinkage. Like an over-pigmented stock, it has poorer tensile and flex crack resistance to compensate for its markedly improved processability. Three hundred and fifty thousand pounds' production schedules for April and May testify to its popularity. Production is limited by shortage of divinyl benzene. X-294 is the AC variant of X-285.

X-283 is a clay masterbatch with 100 of Buca A to 100 GR-S. The Silene masterbatch is not yet available.

[3] "Chemical Derivatives of Synthetic Rubbers," by J. D. D'Ianni, F. J. Naples, J. W. Marsh, and J. L. Zarney. See INDIA RUBBER WORLD, Mar., 1946, p. 815.

Tailor-Made GR-S Types

In the early days of the Office of the Rubber Director, H. E. Simmons and John Ball ran an information service which greatly assisted the industry in getting started on GR-S. Later the various branches of the rubber goods manufacturing industry had industry and technical committees for the exchange of information. These committees and the Technical Section of the Rubber Bureau now offer the best avenue for getting your ideas to Rubber Reserve of what you want in the way of improved or different polymers.

If you feel that some change in the properties of GR-S would improve its performance in some product you manufacture, pass your requirements through your industry committee to the Technical Section of the Rubber Bureau. They in turn will take them up with the Research and Development Section of Rubber Reserve. If the requirements appear possible of attainment, an experimental rubber will probably be made and sent back through for evaluation. If a sufficient tonnage is required to justify it, an experimental rubber can be made in the full-scale plants.

During the last week in April I was invited to sit in on a discussion between the Research and Development Section of the Office of Rubber Reserve, the Technical Section of the Rubber Division of C.P.A., and the Rubber Footwear Industry Committee. They had several problems connected with GR-S. As an illustration I will mention one—to get a GR-S with better flow properties during cure. A more thermoplastic polymer should help. Several ways are known to increase thermoplasticity. The most direct one is to increase the styrene content of the polymer. A 50-50 polymer is already available as X-245 with a non-staining stabilizer. Of course it may have too high a freeze point, but a blend with regular GR-S would probably give improved flow in cure and still be usable as far as cold properties go. There is a lot of such information available if you will only go after it.

I have mentioned the Research and Development Section of Rubber Reserve two or three times, and in the few minutes I have left I would like to outline the organization. The Research and Development Section is responsible for the coordination and integration of the research programs on synthetic rubber, reimbursable by government funds. The research contracts with the four major rubber companies are mentioned in the "Report on the Rubber Program 1940-1945" issued by Rubber Reserve Co. under date of February 24, 1945. In addition to the original research contracts there is a provision for reimbursable research and development in the copolymer plant operating agreements. From the early days of Office of the Rubber Director there have been a number of research contracts with universities and research institutions.

All of these research contracts come under the jurisdiction of the Research and Development Section. The section is organized under a manager, who is a member of the Research Management Committee, consisting of representatives of the four major companies who have been doing 75-80% of the research and development on GR-S. The members of this committee are H. L. Trumbull, M. G. Shepard, J. N. Street, and A. M. Clifford. Dr. Trumbull is currently serving a four-month tour of

(*Continued on page 379*)

The French Rubber Institute

THE recent arrival of photographs showing a general view of the buildings of the Institut Français du Caoutchouc and some interiors, reproduced on these pages, served as a forcible reminder that for ten years now France has also had her own first-class organization devoted to scientific and technological research on rubber.

The Institut Français du Caoutchouc, it may be recalled, was created for France, following the decision of the governments participating in the International Rubber Regulation Agreement, to establish appropriate research and propaganda bodies. The organization may be said to have originated in the laboratories of the organic chemistry department of the College de France, the facilities of which were offered to the Institute's research center in 1936 by Professor Delepine. The rapid growth of the Institute soon made independent quarters imperative, and the premises at 42 Rue Scheffer, Paris, were acquired, and here since 1940 the different divisions of the Institute have been housed.

These divisions, which are coordinated under a general secretariate, include in addition to the research center, a center of documentation and a center of applications.

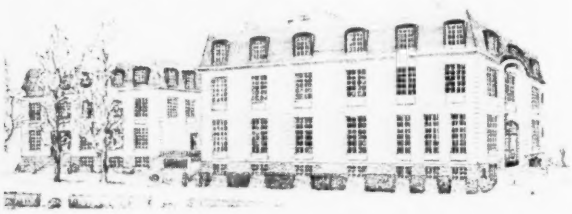

Fig. 1. Buildings of the Institut Francais du Caoutchouc

Fig. 2. The Council Chamber: In the Background, a Painting by Regal Showing the Rubber Producing Regions in the Far East and the Experiment Stations

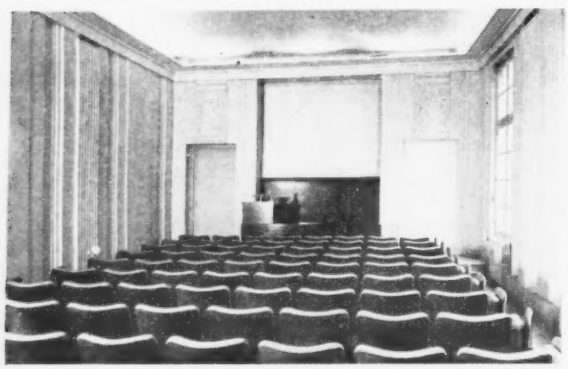

Fig. 3. The Lecture Hall, Named after Fresneau, Engineer of the King at Cayenne, Who Was the First "Rubber Engineer"

The Research Center

The Research center is divided into six different departments, respectively for: technical instruction; pure research; agronomy; technology (which keeps abreast of technological progress and aims to improve apparatus for treating and testing rubber both in the home country and on the plantation); standardization of tests, and applied research. The latter department is again divided into a section aiming at standardization of rubber, with special emphasis on latex tests and the uniformity of rubber, and a section of applications which keeps in touch with the applications center.

The research center has laboratories for work on problems of chemistry, analysis, spectrography, aging, and gas analysis; technology and physical testing rooms; and its own dark room.

The up-to-date equipment includes mills; autoclaves; platform vulcanizing presses provided with temperature and pressure regulators and recorders; an automatic spectrograph for ultra-violet light studies; an extruding machine with the latest improvements; apparatus for microphotography; Shopper, Scott, Lhomme and Argy dynamometers; Dufraisse manometers for studying oxidizability; a Sharples supercentrifuge; various types of plastometers (Williams, Marzetti, Hoekstra); appliances for various tests (surface tension, pH measurements, abrasion, etc.).

The applications center, primarily a propaganda office, is divided into a section for studying (in collaboration with producers, manufacturers, and consumers) new uses for rubber, and another section for stimulating interest of technical circles and of the general public in new developments and possibilities of rubber by means

Fig. 4. A View of One of the Chemical Laboratories

of fairs, exhibitions, congresses, etc. The center collaborates closely with the research center and also with the documentation center.

The Documentation Center

The documentation center was originally connected with the research center, but has been functioning as a separate department since July, 1942.

As its name suggests, the documentation center collects, classifies, and disseminates all literature relating to the affairs and progress of rubber throughout the world, regardless of age, form, or language. The center prepares bibliographies of current literature and intends also to go through the literature of the past and eventually to complete a national bibliography of rubber. Attached to the documentation center is a library specializing in rubber, gums, and resins, with reading room open to the general public, as well as a lending library which contains a limited number of current works of reference.

This department is also responsible for the publications of the Institut Français de Caoutchouc which includes in addition to the *Revue générale du Caoutchouc*:

"Bulletin de l'Institut Français du Caoutchouc," started in August, 1941, which summarizes for the rubber producers the activities of the Institut itself and keeps them posted on the principal activities of similar home organizations;

"Bulletin de l'Institut de Recherches sur le Caoutchouc en Indochine," started at the end of 1941 by the Indo-China Institute to inform planters of its work and the latest improvements in plantation technique;

"Caoutchouc," bulletin of the *Union des Planteurs de Caoutchouc*, the principal object of which is to keep planters posted on the activities of the different colonial research organizations in the world and to inform them of developments in rubber in all producing countries. This bulletin issues four supplements which appear at irregular intervals: agronomical supplements, devoted to all phases of production; scientific supplements, specializing in laboratory research; technical supplements, relating to the applications of rubber in its many fields; and special supplements, relating to problems which cannot be classified under the preceding heads.

Organization of the Institut

The activities of the Institut Français de Caoutchouc are supported and guided by an advisory body composed of an advisory committee, associate members, special committees, and independent collaborators.

The administrative council is composed of: Ch. Dufraisse, honorary president, professor at the College de France; P. Blanchard and Governor-General Le Gallen, honorary members; Ph. Langlois-Berthelot, president; R. M. E. Michaux, vice-president; Inspector of Colonies Monguillot, representing the governor-general of Indo-China; and M. Bos, M. Guyot, P. Petithuguenin, and A. de Vogue, members.

The advisory committee has for president M. Langlois-Berthelot (president of the *Union des Planteurs de Caoutchouc*), and for vice president, M. Michaux (vice president of the *Union des Planteurs de Caoutchouc.*).

The associate members are M. Bocquet, P. Michaux, A. Thomas, I. Sibiriakoff, and A. Haehl.

The special committees and their respective presidents are: pure research, M. Delepine; applied research, M. Michaux; technical instruction, M. Michaux; documentation, M. Guyot; standards, M. Bos; experiments, M. Bos; applications and propaganda, M. Petithuguenin; liaison, M. Longlois-Berthelot; and *Revue générale du Caoutchouc*, M. Guyot.

The management includes F. Muller de Beaupre, deputy general; R. de Padirac, secretary general and managing director; S. Reizler, director of the center of documentation; J. le Bras, director of the research center, assisted by P. Compagnon and A. Jarrijon, assistant directors; and H. Demongeot, director of the center of applications.

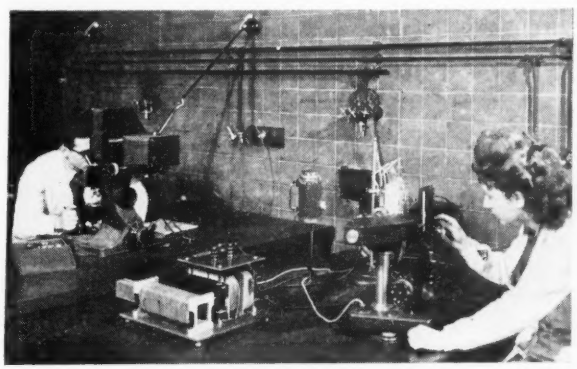

Fig. 5. The Optics Laboratory: In the Foreground, Recording Spectrograph for Ultra-Violet Light; in the Rear, Microscope Provided with Devices for Microphotography and Projection

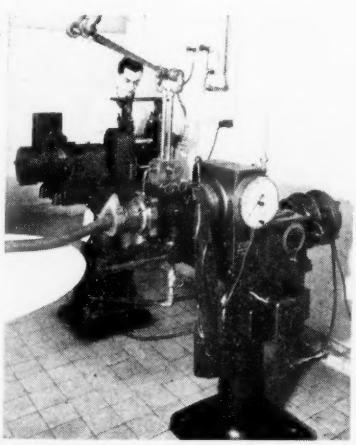

Fig. 6. Laboratory Extruder in the Foreground, Equipped with Variable Speed for the Screw (20 to 65 R.P.M.) and Temperature Regulator on the Draw Plate; Small Two-Roll Mill in the Background.

Fig. 7. Different Types of Platen Presses Equipped with Automatic Regulators and Recorders

Reclaimed Rubber during Reconversion[1]

J. M. Ball[2] and R. L. Randall[2]

WHEN the rubber industry was converting from natural rubber to synthetic rubber, it did not have to make a similar conversion in the use of reclaim because natural rubber reclaim was still available. Now, however, when the supply of natural rubber reclaim is getting short, conversion will gradually have to be made to synthetic rubber reclaims. Indeed such conversion began well over a year ago.

It becomes important, therefore, even though a limited amount of straight natural rubber reclaim may always be available, to try to understand the general character of the reclaims that can be made from tire scrap containing synthetic rubber; and it is the purpose of this paper to describe some simple laboratory work which has been done on this subject. But first some thought should be given to the composition of various types of scrap tires, as tire scrap is the most important of all available sources of reclaim.

Composition of Tire Scrap

During the present reconversion from wartime to peacetime production, natural rubber is again arriving in North America and will again be used in quantity so that the ratio of synthetic rubber consumed to total new rubber consumed will presumably decrease. By new rubber is meant natural and synthetic rubber exclusive of reclaim. If this ratio for tire manufacture for the decade 1940-49 is plotted, as in Figure 1, it is seen that it reaches a maximum and then after 1946 begins to decrease for both passenger tires and truck tires. The data for this graph are given in Table 1.

TABLE 1. RATIO OF SYNTHETIC RUBBER CONSUMPTION TO TOTAL NEW RUBBER CONSUMPTION IN TIRES MADE IN THE U.S.A.

Year	Passenger Tires	Truck Tires
1940-42	0	0
1943	97.6%	27.4%
1944	98.1	66.4
1945	98.1	75.4
1946	97.6	75.4
1947	93.0	..
1948	65.0	15.0
1949	65.0	15.0

The data are from a report made by E. J. Sternberg in November, 1945, during his connection with the Rubber Bureau, Washington, D. C. They are derived from official statistical records of the Rubber Director's Office and of the Rubber Bureau and also from estimates for the future submitted to the Rubber Bureau by the Tire Industry Technical Committee. The data through the third quarter of 1945 may be considered accurate. The data for the future are, of course, not ironclad, but are nevertheless based upon the best information available when the estimates were made.

[1] Presented before the Ontario Rubber Section, C.I.C., Feb. 21, 1946, at Toronto, Ont., Canada.

[2] Midwest Rubber Reclaiming Co., East St. Louis, Ill.

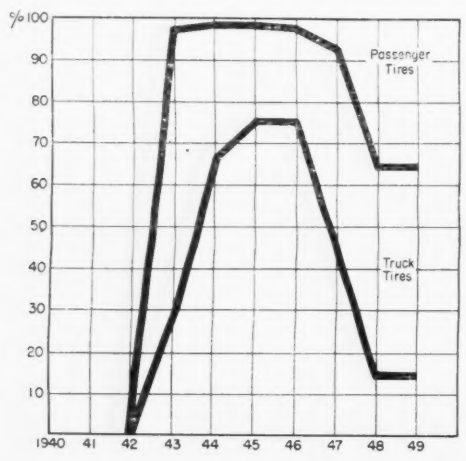

Fig. 1. Ratio of Synthetic to Total Rubber Consumption

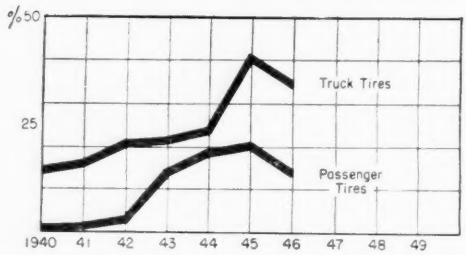

Fig. 2. Ratio of Tires Recapped to All Tires in Use

Table 1 clearly shows the well-known difference in composition between passenger tires and truck tires and also shows how the composition of both classes of tires has changed and will probably continue to change for the next few years. Some of these passenger tires and truck tires are now appearing on the scrap heap, and many of them are being made into reclaimed rubber. (Tire rationing accelerated the appearance of tires as scrap because the certificate holder was required to turn in his old tire when he bought a new one.) It seems clear that the composition of tire scrap will vary over the next few years and that the reclaimer will have to be guided accordingly.

Recapped Tires

During the war, before any synthetic tires at all had been made, motorists were riding on prewar tires made originally of natural rubber. About one-half of these natural rubber tires have since been recapped so that a large proportion of the tires coming on the scrap heap now are these prewar recapped tires. Mr. Sternberg has estimated the proportion of tires recapped each year to all tires operating on vehicles in the United States during 1940-46. Figure 2 illustrates the data which are given in Table 2.

TABLE 2. ESTIMATED PROPORTION OF TIRES RECAPPED EACH YEAR TO ALL TIRES OPERATING ON VEHICLES IN THE U.S.A.

Year	Passenger Tires	Truck Tires
1940	0.7	14.1
1941	1.6	16.7
1942	2.7	21.0
1943	14.7	21.6
1944	18.9	23.1
1945	20.8	40.2
1946	14.3	35.2

In this graph the line representing truck tires lies above the line representing passenger tires because there was already a substantial business in the recapping of truck tires before the war, and that business naturally grew during the war. The graph represents the proportion of tires recapped each year, which is naturally much less than the proportion of such tires coming on the

scrap heap. For example in 1945, 20% of all passenger tires operating on vehicles in the United States were recapped, but the proportion of recaps coming on the scrap heap in that year was probably nearer to 40% because collections included many of the tires recapped during the three-year period, 1943-45. Similarly in 1945, 40% of all the truck tires operating on vehicles were recapped, but the proportion appearing as scrap in that year was probably nearer to 60%. No data are available for making estimates for the period after 1946.

Natural rubber tires with synthetic recaps represent a very large source of tire scrap today, and reclaim made from this source will probably be the next large volume reclaim. After that, or along with it, will presumably come the reclaim made from synthetic tires containing various proportions of natural rubber or from blends of synthetic tires and natural rubber tires. The big volume reclaim for the future will consist of blends rather than of straight synthetic.

The subject of tire scrap composition has now been briefly considered; and the question which remains to be answered is, "What is the general character of the reclaims that can be made from these various kinds of scrap?"

The Laboratory Work

As natural rubber returns, there are four possible ways in which its use can be meshed with that of synthetic rubber. Tires may consist of:

1. Compounds containing natural rubber alone.
2. Compounds containing synthetic rubber alone.
3. Compounds containing mixtures of natural rubber and synthetic rubber.
4. Natural rubber compounds and synthetic rubber compounds used in different parts of the same tire.

These various possibilities are illustrated in Table 3.

N represents an ordinary first-quality prewar tread stock of natural rubber, and S represents a comparable first-quality wartime tread stock of GR-S. The first two compounds were prepared in the laboratory, and then portions of them were mixed together 50/50 in the uncured state to give the third compound, NS. These three compounds represent three of the four possibilities just mentioned.

Table 3. Formulae of the Original Compounds

	N	S	NS
Smoked sheet	100	..	50
GR-S	..	100	50
Stearic acid	3	1	2
Pine tar	2	..	1
Gum turpentine	..	2	1
Coal-tar softener	..	5	2.5
Antioxidant	1	1	1
Zinc oxide	3	3	3
EPC black	47.5	45	46.25
Sulfur	3	1.6	2.3
Mercaptobenzothiazole	1	1.6	1.3
D.P.G.	..	0.1	0.05
	160.5	160.3	160.4

On the day after mixing, portions of each of the three stocks were sheeted out and given a range of cures from 15 to 75 minutes in a laboratory mold at 287° F. Properties of each compound are given in Table 4.

Table 4. Properties of the Original Compounds

	N	S	NS
Stress at 300%, p.s.i.	1290	850	1180
Tensile, p.s.i.	4080	1960	3350
% elongation	640	525	600
Tear resistance, p.s.i.	680	250	420
Shore hardness	67	62	65
Resilience*	39.5	39.0	39.5
Heat build-up—°C.†	72	96	86

* Lupke rebound. Room temp.
† Goodrich flexometer. A.S.T.M. D 623-41 T. Room temp.

These properties are averages of three cures, except for the last two properties which are for one selected cure only.

These results are such as would be expected. Note that nearly all of the properties of Compounds NS are intermediate between those of the other two.

Preparation of the Reclaims

The remainder of each batch was sheeted out, plied up and cured in a large slab mold ½" thick, the cure being 5 minutes longer than the selected cure for the regular test slab. A few days later these large slabs were ground up separately and converted into four different neutral digester reclaims designated in Table 5.

Table 5. Designation of the Reclaims

Designation	Source
RN	Vulcanizate N
RS	Vulcanizate S
RNS	Vulcanizate NS
R(N+S)	Vulc. N+Vulc. S (Equal weights)

These four reclaims were made from vulcanizates representing the four possible ways previously mentioned in which natural and/or synthetic rubber may be used in tires.

Figure 3 is a photograph of a battery of two laboratory digesters or cannons in which the reclaims were made. These cannons are in the vertical position while being loaded, as shown on the right, but are in the horizontal position while being operated. The contents are stirred continuously during the reclaiming and, at the end of the process after removal of the lid, are blown out with a hose on to a screen where washing takes place. The residue is then dried and refined in the laboratory. Each cannon holds about eight pounds of cured scrap.

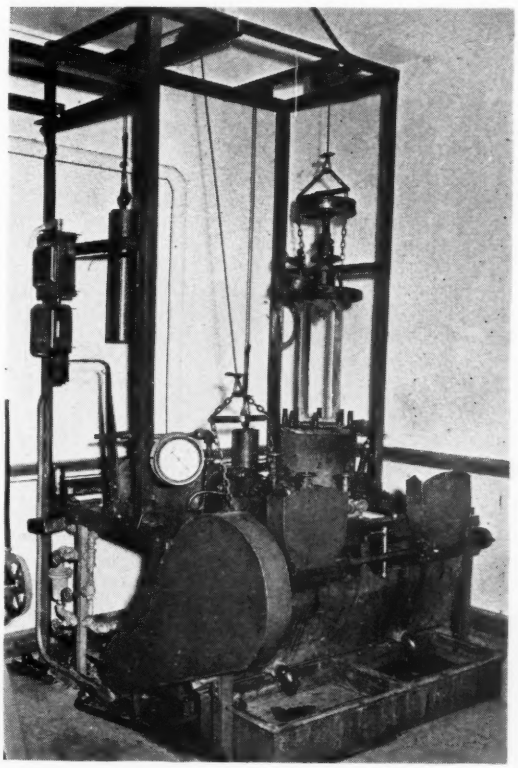

Fig. 3. Battery of Two Laboratory Digesters Used

The analyses of these reclaims are given in Table 6.

TABLE 6. ANALYSES OF THE RECLAIMS

	RX	RS	RNS	R(N+S)
Sp. gr.	1.123	1.110	1.113	1.113
Acetone extract	7.0	24.6	16.8	17.4
Chloroform extract	0.8	0.7	0.6	0.7
Ash	3.1	1.8	2.8	2.7
Carbon black	29.9	23.7	27.4	26.3
R.H.C. by Dif.	57.4	47.8	51.9	51.3

The high acetone extract of RS is due to the relatively large proportion of softener in the original compound and also to absorption of a portion of the reclaiming oils, which for synthetic rubber scrap are less fugitive than for natural rubber scrap. Note that the compositions of the last two reclaims are practically identical, as would be expected, and that they are intermediate between those of the first two reclaims.

The reclaims were then tested in this compound given below:

	Reclaim Test Compound
Reclaim R.H.C.	100
Stearic acid	1
Zinc oxide	3
Sulfur	3
Benzothiazyl sulfenamide	1.5
	108.5

The synthetic reclaims cure more slowly than the RX, and owing to somewhat erratic tensiles the results from three cures, viz., 15, 30, and 60 minutes were averaged.

TABLE 7. PHYSICAL PROPERTIES OF THE RECLAIMS

	RX	RS	RNS	R(N+S)
Stress at 100%, p.s.i.	300	160	230	230
Tensile, p.s.i.	1450	1230	1250	1310
% elongation	290	380	310	320
Tear resistance, p.s.i.	200	100	130	140
Shore hardness	64	53	60	60

The chief point to note here is that RS, when cured, is softer and stretchier than RX and has lower tear resistance. The properties of the last two reclaims, when cured, are practically identical and are intermediate between those of the two first.

The tensiles of these reclaims may be compared with those of the original compounds:

TABLE 8. TENSILES OF RECLAIMS AND ORIGINAL COMPOUNDS

	N	S	NS	N+S
Tensile of original compound, p.s.i.	4080	1960	3350	(3020)
Tensile of reclaim, p.s.i.	1450	1230	1250	1310
Recl. tens./orig. tens.	36%	63%	37%	43%

Note that the tensiles of these reclaims do not differ widely from each other, but that RS has the highest tensile in relation to that of its original compound. The tensile in parenthesis is a calculated value obtained by averaging the values for compounds N and S.

Substituting Reclaim in the Original Compounds

Most rubber men consider that the real value of a reclaim is best determined in a compound in which the reclaim is to be used commercially, or in some suitable test compound containing new rubber and fillers. Therefore it was decided to test each of the four reclaims in each of the three original compounds, making 12 compounds in all. One-third of the natural and/or synthetic rubber in each of the three original compounds was replaced with reclaim on an equal rubber hydrocarbon basis. No other compounding adjustment was made. The formulae of the 12 substituted compounds are given in Table 9.

These substituted compounds are used in this paper merely as test compounds, but it may be stated, incidentally, that they are of a general type suitable for consideration as undertreads.

TABLE 9. FORMULAE OF THE SUBSTITUTED COMPOUNDS

N Series

	N-RX	N-RS	N-RNS	N-R(N+S)
Smoked sheet	67	67	67	67
RX	58	..	..	..
RS	..	70	..	..
RNS	..	..	65	..
R(N+S)	..	..	..	65
Stearic acid	3	3	3	3
Pine tar	2	2	2	2
Antioxidant	1	1	1	1
Zinc oxide	3	3	3	3
EPC black	47.5	47.5	47.5	47.5
Sulfur	3	3	3	3
Mercaptobenzothiazole	1	1	1	1
	185.5	197.5	192.5	192.5

S Series

	S-RX	S-RS	S-RNS	S-R(N+S)
GR-S	67	67	67	67
RX	58	..	..	..
RS	..	70	..	..
RNS	..	..	65	..
R(N+S)	..	..	..	65
Stearic acid	1	1	1	1
Gum turpentine	2	2	2	2
Coal-tar softener	5	5	5	5
Antioxidant	1	1	1	1
Zinc oxide	3	3	3	3
EPC black	45	45	45	45
Sulfur	1.6	1.6	1.6	1.6
Mercaptobenzothiazole	1.6	1.6	1.6	1.6
D.P.G.	0.1	0.1	0.1	0.1
	185.3	197.3	192.3	192.3

NS Series

	NS-RX	NS-RS	NS-RNS	NS-R (N+S)
Smoked sheet	33.5	33.5	33.5	33.5
GR-S	33.5	33.5	33.5	33.5
RX	58	..	..	..
RS	..	70	..	..
RNS	..	..	65	..
R(N+S)	..	..	..	65
Stearic acid	2	2	2	2
Pine tar	1	1	1	1
Gum turpentine	1	1	1	1
Coal-tar softener	2.5	2.5	2.5	2.5
Antioxidant	1	1	1	1
Zinc oxide	3	3	3	3
EPC black	46.25	46.25	46.25	46.25
Sulfur	2.3	2.3	2.3	2.3
Mercaptobenzothiazole	1.3	1.3	1.3	1.3
D.P.G.	0.05	0.05	0.05	0.05
	185.4	197.4	192.4	192.4

The results of substituting the reclaims in each of the original compounds can be shown in three tables. Again an average of three cures is used except for the last two properties which were obtained on one selected cure only.

TABLE 10. PROPERTIES OF SUBSTITUTED COMPOUNDS—N SERIES

	N	N-RX	N-RS	N-RNS	N-R (N+S)
Stress at 300%, p.s.i.	1290	1920	1300	1510	1710
Tensile, p.s.i.	4080	2750	2570	2700	2940
% elongation	640	410	500	460	470
Tear resistance, p.s.i.	680	610	490	550	530
Shore hardness	67	74	72	74	74
Resilience	39.5	32	31	31	32
Heat build-up—°C.	72	87	75	81	84

Compound N is the control, and its properties have already been given in Table 4. The introduction of reclaim has generally increased the stiffness, hardness, and heat build-up and has lowered the tensile, elongation, and resilience. The four reclaim compounds, however, are all good ones and do not differ greatly in properties. The point to be stressed is that any one of the four reclaims, although differing so widely from the others in its source can be used satisfactorily in a natural rubber compound.

TABLE 11. PROPERTIES OF SUBSTITUTED COMPOUNDS—S SERIES

	S	S-RX	S-RS	S-RNS	S-R (N+S)
Stress at 300%, p.s.i.	850	1490	710	1080	1060
Tensile, p.s.i.	1960	2110	2090	2140	2080
% elongation	525	400	620	490	500
Tear resistance, p.s.i.	250	240	270	290	270
Shore hardness	62	70	61	67	68
Resilience	39	34	32	33	32
Heat build-up—°C	96	98	103	97	94

Here S is the control, and its properties have already been given. In this series the tensile is actually increased a bit by the use of reclaim, and in one case the elongation also is increased. All the compounds have practically the same tear resistance, and all have relatively low modulus and hardness. The reclaim has lowered the resilience, but has not changed the heat build-up appreciably. Here again the point to be stressed is that any one of the four reclaims can be used quite satisfactorily in a GR-S compound.

TABLE 12. PROPERTIES OF SUBSTITUTED COMPOUNDS—NS SERIES

	NS	NS-RN	NS-RS	NS-RNS	NS-R (N+S)
Stress at 300%, p.s.i.	1180	1960	1200	1640	1680
Tensile, p.s.i	3350	2630	2420	2620	2470
% elongation	600	390	500	440	440
Tear resistance, p.s.i..	420	390	430	360	370
Shore hardness	65	73	69	73	73
Resilience	39.5	36	34	33	33
Heat build-up—°C. ..	86	90	91	88	82

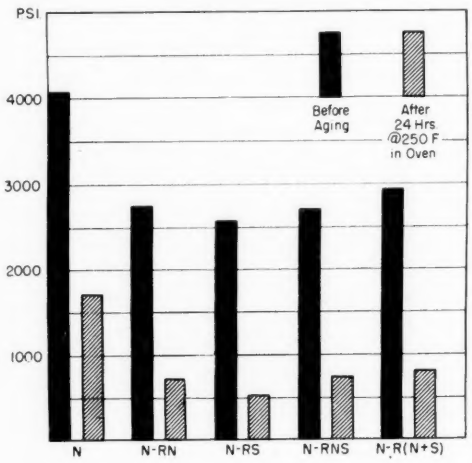

Fig. 4. Tensile Strength—N Series

Compound NS is the control. The reclaim compounds in this series are similar to the corresponding compounds in the N, (Table 10), series, except that tear resistance is lower and that heat build-up tends to be higher. Again each of the reclaims is satisfactory in a compound containing both natural rubber and GR-S.

Properties after Aging

The three original compounds and also the 12 compounds containing the reclaims were oven aged 24 hours at 250° F., and again the results can be shown in three tables.

TABLE 13. PROPERTIES AFTER AGING—N SERIES

	N	N-RN	N-RS	N-RNS	N-R (N+S)
Tensile, p.s.i	1720	720	660	740	800
% elongation	240	200	120	230	250
Tear resistance, p.s.i..	260	200	170	210	190
Shore hardness	74	82	82	81	82
Resilience	36	30	28	28	29
Heat build-up—°C. ..	84	93	93	100	100

The compounds in this series have suffered in this severe heat aging test, but all the reclaim compounds are about equal.

TABLE 14. PROPERTIES AFTER AGING—S SERIES

	S	S-RN	S-RS	S-RNS	S-R (N+S)
Tensile, p.s.i.	1340	1660	1960	1620	1470
% elongation	210	190	240	200	180
Tear resistance, p.s.i..	130	180	190	190	200
Shore hardness	73	80	79	80	81
Resilience	41	34	32	33	33
Heat build-up—°C. ..	86	67	84	90	84

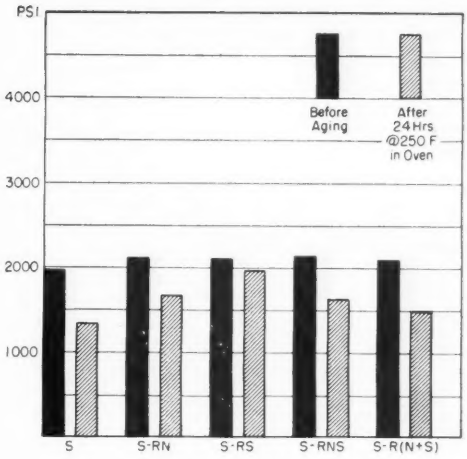

Fig. 5. Tensile Strength—S Series

The tensiles of the reclaim stocks have declined relatively little and are actually higher than that of the control. The tear resistance of the reclaim stocks is higher than that of the control, and heat build-up has actually improved. All the reclaim compounds have similar properties.

TABLE 15. PROPERTIES AFTER AGING—NS SERIES.

	NS	NS-RN	NS-RS	NS-RNS	NS-R (N+S)
Tensile, p.s.i.	1400	1250	1020	1020	930
% elongation	190	150	130	120	120
Tear resistance p.s.i. ..	150	140	150	140	170
Shore hardness	75	81	81	83	82
Resilience	41	30	29	29	29
Heat build-up—°C. ..	91	102	98	101	102

Here again the reclaim compounds are all rather similar.

Tensiles before and after Aging

Figures 4, 5, and 6 show the tensiles of all the compounds both before and after aging in the oven 24 hours at 250° F. A comparison of these graphs leads to the following summary:

1. The reclaim compounds of the N Series have the highest tensiles before aging, but the lowest tensiles after aging.

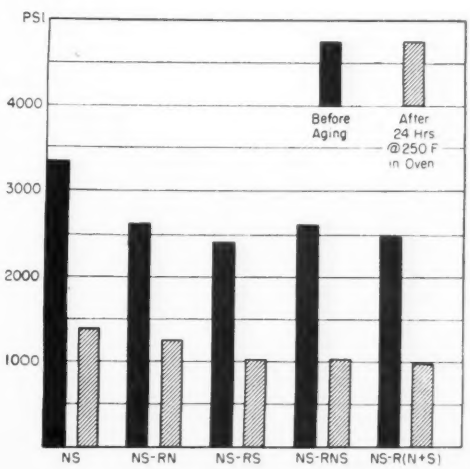

Fig. 6. Tensile Strength—NS Series

2. The reclaim compounds of the S Series have the lowest tensiles before aging, but the highest tensiles after aging.

3. The reclaim compounds of the NS Series have tensiles intermediate between those of the other two series, both before and after aging.

4. The four reclaim compounds in each series are not widely different from each other (within a given series) either before or after aging.

Interchangeability of Reclaims

When it is stated that all four of the reclaims give satisfactory results when used in the three original compounds, it is not implied that the reclaims are necessarily interchangeable. Interchangeability usually means that one reclaim can replace another pound for pound without requiring any other change whatever. These four reclaims are not intended to be strictly interchangeable. They represent different types and therefore have different processing properties and rates of cure. They are satisfactory, but not identical.

Processing Properties

Inasmuch as this is strictly a laboratory paper, no attempt has been made to get any data on the effect of the various reclaims on processing properties. Freshly cured scrap was used, and the reclaims themselves were tested when freshly made.

Commercial experience, however, indicates that synthetic rubber reclaims or blends such as discussed in this paper are excellent from the processing standpoint. Although at present they command a premium price on account of greater manufacturing cost, they are in strong demand particularly for tire carcass stocks because they tend to prevent sticking to calender rolls. They are also superior in extruded stocks primarily because of greater smoothness.

Summary and Conclusion

1. The composition of tires made during the war, and of those to be made during the next few years is characterized by various and changing ratios of synthetic and natural rubber.

2. These tires are now available as scrap rubber and will continue to be available as long as we have a synthetic rubber industry.

3. The recapping industry grew tremendously during the war with the result that about one-half of the prewar tires made originally of natural rubber have since been recapped, and these recapped tires are now a very large source of tire scrap. They are generally composed of a natural rubber carcass and sidewall and a synthetic rubber cap.

4. In order to learn something about the properties of the reclaims that will have to be made from these various kinds of scrap, the Midwest laboratory has prepared four reclaims from known compounds, representing the four possible ways in which natural and synthetic rubber can be used in tires. These reclaims have been tested in the three original compounds, and it has been shown that they all give satisfactory results, and that no unusual compounding problems are indicated by these tests.

Acknowledgment

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Appendix

This appendix contains all data on tensile properties, tear resistance, and hardness for the three original compounds and also for the 12 substituted compounds, both before and after aging.

The three cures at 287° F. used for averaging purposes are:

Series	Minutes
N	30, 45, 60
S	45, 60, 75
NS	45, 60, 75

The one selected cure used as a base for the determination of resilience and heat build-up and for preparation of the ½-inch slabs from which the reclaims were made is:

Series	Minutes
N	45
S	60
NS	50

PROPERTIES BEFORE AGING—N SERIES

Compound	Cure at 287° F. Min.	Stress at 300%, p.s.i.	Tensile p.s.i.	% Elongation	Tear Resist. p.s.i.	Shore Hardness
N	15	880	3570	700	850	62
	30	1170	4130	650	750	66
	45	1290	4180	640	600	67
	60	1400	3920	630	690	69
	75	1310	4000	590	590	70
N-RN	15	1410	2870	520	640	68
	30	1840	2910	450	620	71
	45	1940	2660	400	640	75
	60	1980	2680	380	560	75
	75	1960	2560	370	440	74
N-RS	15	610	2220	690	490	65
	30	1070	2570	550	550	69
	45	1330	2670	500	490	73
	60	1500	2460	450	430	74
	75	1530	2500	430	560	74
N-RNS	15	1020	2520	560	560	68
	30	1250	2700	490	570	73
	45	1480	2620	460	500	74
	60	1800	2770	430	590	75
	75	1810	2510	400	510	75
N-R(N+S)	15	1010	2730	620	520	68
	30	1530	3020	510	540	71
	45	1790	2880	460	580	75
	60	1800	2920	450	480	76
	75	1840	2420	400	400	77

PROPERTIES BEFORE AGING—S SERIES

Compound	Cure at 287° F. Min.	Stress at 300%, p.s.i.	Tensile p.s.i.	% Elongation	Tear Resist. p.s.i.	Shore Hardness
S	15	200	400	750	110	51
	30	540	1660	675	230	58
	45	700	2000	600	260	61
	60	860	1960	520	250	62
	75	1000	1920	460	240	62
S-RN	15	610	1070	490	180	63
	30	1090	2020	490	260	65
	45	1350	2130	440	260	69
	60	1500	2090	380	240	70
	75	1620	2100	370	230	70
S-RS	15	170	300	620	70	53
	30	410	1260	680	200	56
	45	590	1790	650	240	59
	60	690	2190	620	270	61
	75	860	2290	600	290	63
S-RNS	15	320	580	510	110	62
	30	720	1580	550	240	63
	45	910	2090	540	320	65
	60	1130	2250	490	260	68
	75	1190	2080	450	300	68
S-R(N+S)	15	330	550	520	110	59
	30	740	1640	560	200	63
	45	890	1990	540	280	67
	60	1110	2080	490	270	69
	75	1190	2160	460	270	69

PROPERTIES BEFORE AGING—NS SERIES

Compound	Cure at 287° F. Min.	Stress at 300%, p.s.i.	Tensile p.s.i.	% Elongation	Tear Resist. p.s.i.	Shore Hardness
NS	15	440	2210	800	410	56
	30	800	3230	750	570	62
	45	1050	3390	640	500	64
	60	1190	3350	590	450	65
	75	1310	3330	560	300	66
NS-RN	15	1090	2400	580	520	68
	30	1610	2660	470	440	70
	45	1800	2640	410	400	72
	60	1960	2620	390	400	74
	75	2110	2630	380	380	74
NS-RS	15	390	1300	720	220	58
	30	780	2190	600	500	63
	45	1020	2470	540	400	68
	60	1220	2420	500	450	70
	75	1360	2380	450	440	70
NS-RNS	15	700	1890	630	420	66
	30	1200	2460	510	440	68
	45	1500	2740	470	390	72
	60	1640	2570	440	360	73
	75	1790	2540	400	320	73
NS-R(N+S)	15	780	1930	620	420	63
	30	1290	2410	500	440	68
	45	1600	2520	450	380	72
	60	1710	2440	410	340	73
	75	1720	2460	380	380	73

PROPERTIES AFTER 24 HOURS IN OVEN AT 250° F.—N SERIES

Compound	Cure at 287° F. Min.	Tensile p.s.i.	% Elongation	Tear Resist., p.s.i.	Shore Hardness
N	30	2030	280	280	73
	45	1650	240	220	75
	60	1480	210	270	75
N-RN	30	860	250	230	81
	45	640	140	180	82
	60	660	200	180	83
N-RS	30	610	150	170	81
	45	690	120	130	83
	60	670	100	200	83
N-RNS	30	810	260	190	80
	45	650	200	170	81
	60	770	230	260	82
N-R(N+S)	30	800	250	190	81
	45	780	250	200	82
	60	810	240	180	82

PROPERTIES AFTER 24 HOURS IN OVEN AT 250° F.—S SERIES

Compound	Cure at 287° F. Min.	Tensile p.s.i.	% Elongation	Tear Resist., p.s.i.	Shore Hardness
S	45	1310	220	110	71
	60	1170	200	140	73
	75	1550	230	140	75
S-RN	45	1450	170	160	81
	60	1750	200	190	80
	75	1770	210	200	80
S-RS	45	1980	240	190	78
	60	2030	230	200	79
	75	1860	250	180	79
S-RNS	45	1670	200	190	81
	60	1780	230	190	80
	75	1420	180	200	79
S-R(N+S)	45	1720	200	230	81
	60	1320	170	200	82
	75	1370	170	170	81

PROPERTIES AFTER 24 HOURS IN OVEN AT 250° F.—NS SERIES

Compound	Cure at 287° F. Min.	Tensile p.s.i.	% Elongation	Tear Resist., p.s.i.	Shore Hardness
NS	45	1340	170	120	75
	60	1330	190	160	75
	75	1540	220	170	76
NS-RN	45	1250	150	130	82
	60	1300	150	140	81
	75	1190	140	140	81
NS-RS	45	960	120	140	81
	60	970	110	150	82
	75	1130	150	150	81
NS-RNS	45	840	110	140	83
	60	1070	120	140	82
	75	1100	120	140	83
NS-R(N+S)	**45**	810	110	190	82
	60	900	120	150	81
	75	1080	140	160	82

OPB Bibliography Reports on Rubber Products—I

THE Office of the Publication Board of the United States Department of Commerce began on January 25, 1946, the issuance and sale of its "Bibliography of Scientific and Industrial Reports," which lists according to subject matter information obtained from Germany and from countries formerly occupied by the Germans as well as reports on research sponsored by the U. S. Government. Distributed by the Superintendent of Documents, Government Printing Office, Washington, D. C., the bibliography is available on a weekly basis for a cost of about $10 a year. From issues that have been received to date we believe it worth while to reprint abstracts of these reports on rubber products together with their serial number, price, title, and length, for the benefit of readers of INDIA RUBBER WORLD. As many reports as space permits will be listed each month.

Englebert Fils S. A., Liege - Miscellaneous Chemicals. R. H. Bullard. PB 169. 1945. 9 pages. Mimeo. 10¢. This report enumerates types and uses of Buna received at the Liege plant. It gives a few typical formulations for compounding Buna S, and the method of depolymerizing is briefly described. The following ingredients were used: CK 3 and CK 4, carbon blacks; aluminum oxide called by the Germans, "Tonerde-Gel," a substitute for carbon black and called "white carbon," a good reenforcing pigment; Kautschol and Naftolene ZD (also Naftolene NV, which is not so good), necessary plasticizers; Vulcacite AZ, an accelerator; Koresine, a black resin to make Buna sticky; Antiplast, a substitute for stearic acid; rayon, a substitute for cotton; and Oppanol (isobutylene polymer) for rubber cement (does not stick well). Recently pure natural rubber was used only in the cushion of German tires. The best Buna tires were made with 30% untreated and 70% depolymerized Buna. The Germans have reduced tread thickness because Buna tires separate between plies before the tread is gone. Monthly figures for the factory program, percentage of program realized, weight of tires and percentage of Buna in tires are given. January, 1942 - July, 1944.

Synthetic Rubber. W. C. Davey, P. D. Patterson, and G. L. Hammond. 1945. 64 pages. PB 172. Mimeo. 50¢. Investigations in Paris and Central France in September and October, 1944, giving not only technical information was on the use of various types of Buna and to France and Germany, are included in this report. Records were acquired of the Heidelberg rubber conference, also details of German Buna deliveries to France with code numbers of factories of origin. Technical information was on the use of various types of Buna and the plasticization, compounding, and processing of them and on the performance of Buna tires. Diagrams.

Englebert Factories - Liege and Aachen, Kabelundgumiwerke - Eupen. W. C. Davey, J. J. Robson, and P. D. Patterson. 1944. 67 pages. Mimeo. 50¢. A detailed report on visits to tire factories at Aachen and Liege and a cable factory at Eupen is given. Economic information on the production rates, relations of various rubber companies, relative importance of German tire plants, raw material supplies, and the organization of the German cable industry is provided. Technical sub-

(*Continued on page* 443)

Recent Russian Literature on Natural and Synthetic Rubber—XXI[1]

M. Hoseh

THE Effect of Working on the Physical and Mechanical Properties of Sodium Divinyl Rubber. M. M. Maisenberg, *Kauchuk i Rezina*, 7, 20-24 (1940). **S-55.**

The purpose of this investigation was to elucidate the effects of working the sodium divinyl polymer on the strength properties of the product. The effects of the following operations were studied: (1) mixing the rubber in vacuum mixers; (2) combining various kinds of rubber on mixing rolls; (3) milling the rubber, and (4) refining the rubber.

Treating the crude polymer in industrial vacuum mixers did not affect the plasticity or the mechanical indices of the vulcanized rubber. The various kinds of rubber combined on 60-inch rolls were: (a) crude rubber of various batches; (b) refined rubber and milled rubber; (c) crude rubber and pieces obtained in the refining process. In none of these combinations was there observed any effect of treatment on the plasticity, alkalinity, or mechanical properties of the vulcanized product. The effect of milling was tested on rod polymers, rodless polymers, and polymers from pieces obtained in the refining of rod polymer rubber. Samples were taken after 10 and 60 minutes of milling. Here again the treatment had no significant effect on the plasticity and mechanical properties of the vulcanized product. The effect of refining was tested on: (a) rod polymers with and without antioxidants; (b) rodless polymers with and without antioxidants; (c) rodless polymers mixed with a polydiene; and (d) rubber produced from the pieces obtained in refining. Even 10 passes through the refiner did not affect significantly the properties of the product. Some difference was noted in the behavior of rodless and rod polymers. Thus the plasticity of the rod polymer did not change after one pass. Only after 10 passes did the plasticity decrease somewhat. The plasticity of the rodless polymer was somewhat increased by refining.

Preparation of Reclaim Containing Fiber. I. U. Mishustin, *Kauchuk i Rezina*, 7, 24-28 (1940). **S-56.**

Experiments were carried out on reclaiming rubber containing fibers. The original rubber was 100% SK automobile tire containing 20-25% of plant fiber. The rubber was disintegrated to particles of 2-3 mm., in which stage it contained cord threads 2-3 cm. long and one mm. thick. The disintegrated rubber was mixed with a plasticizer. As such were used: pine rosin, mazut and coumarone resin, a mixture of pine rosin and 20% of colophony, or a mixture of mazut with 20% of colophony. The comminuted rubber and the plasticizer were mixed in a Werner-Pfleiderer for one hour at 80-90° C. Then the mixture was placed into a devulcanizer kettle where it was treated for four hours at three atmospheres with steam. After cooling, the product was milled for 15-20 minutes on cold laboratory rolls. It was observed that on milling the cord threads shortened and became thinner.

The reclaim was combined with 3% of sulfur and 0.2% of Captax, was made into three mm. sheets, and the sheets were vulcanized for 30, 45, or 60 minutes. The reclaim was also compounded into sole mixes. Both the vulcanized sheets and vulcanized soles were then tested. The physico-mechanical indices of the fiber containing product were equally as good as reclaim from rubber containing no fiber. Compared to acid or alkaline reclaim, it had a considerably lower relative elongation and elasticity product. The production of reclaim from tires containing fiber requires simpler equipment than the production of an acid or alkaline reclaim, but the equipment is more complicated than the one required for reclaiming sole rubber. Reclaim containing fibers requires a longer working on rolls than does acid or alkaline reclaim. Generally sole rubber made from fiber containing reclaim has good physico-mechanical properties, but not a sufficiently good surface.

Rubber Lining of Chemical Apparatus. I. V. Biryukov, *Kauchuk i Rezina*, 7, 36-43 (1940). **S-57.**

Sodium divinyl, Sovprene, "Thiokol," and their mixtures were tested for their suitability as linings of chemical apparatus. Washing the divinyl rubber on washing rolls for 60 minutes reduced its ash content from 1.63 to 0.60%, and its alkalinity from 1.02 to 0.05, and the plasticity was raised from 0.42 to 0.61. The divinyl rubber was compounded with "white carbon," gagate, Bakelite, graphite, asbestos, and A.X.F. Of these the best was "white carbon." The latter contained 85.3% of SiO_2, had a moisture content of 7.25%, and specific volume of 8.5 cu.cm. Sovprene alone, i.e., without admixtures of other plastomers proved unsatisfactory; so did "Thiokol" taken without admixtures. Mixes of Sovprene and "Thiokol," "Thiokol" and divinyl, and divinyl alone gave good results. The technique of lining large apparatus and subsequent vulcanization in the open with hot water was described. The linings were tested for their resistance to chemicals and proved resistant to 35% HCl, 50% H_2SO_4, 10% ethylenchlorhydrin, 56% methylene glycol, chlorobenzene, sea water, electrolytic baths for Zn, Ni, Cr, and other chemicals.

Mechanization of Cutting Kok-Saghyz Roots. N. I. Vasil'ev, *Kauchuk i Rezina*, 7, 44-48 (1940). **N-28.**

To prevent injury to the juice bearing vessels and for best preservation of the blade, the knife should be ground at an angle of 15-17°. Other points of cutting the roots are discussed.

Crude Rubber Waste. V. A. Zigmund and M. V. Petrov, *Kauchuk i Rezina*, 7, 50-51 (1940). **SN-94.**

At present considerable sheet rubber is wasted in the assembly shop, usually in the form of cuttings and trimmings, which at times attain vast proportions. Thus 469 tons of such waste were collected in two months. Certain measures are outlined how to reduce the amount of waste and how to process it to the best advantage.

Collecting Carbon Black in Carbon Black Plants. S. M. Karpacheva and V. M. Generalov, *Kauchuk i Rezina*, 7, 51-55 (1940). **M-25.**

[1] Through an error the installment in April was indicated as XVIII, instead of XX; so this issue actually contains the twenty-first installment of this article.

A train for the production of carbon black is outlined, of which the essential parts comprise a burner, a scrubber, and a bag filter. The scrubber is water irrigated and is also used for drying the settled out carbon black. The drying is effected by passing the hot waste gases through the settled out carbon black. While the drying operation is in progress, the irrigation of the scrubber is interrupted.

Production of Carbon Black. N. A. Pirozhkov, *Kauchuk i Rezina*, 7, 56-57 (1940). **M-26.**

Air-cooled heat exchangers used for cooling the combustion products in the production of carbon black are quickly rendered ineffective by layers of carbon black deposited on the walls. The thickness of the deposited layer depends to a considerable extent on the velocity with which the carbon black-laden gas moves through the heat exchanger. It was found experimentally that maintaining the velocity at 10-12 m. per second (32.8-39.4 ft. per second) will reduce the thickness of this layer materially (1-5 mm.). It is also preferable to have the cooler in a vertical position rather than horizontal. The arrangement of filters for the best collection of carbon black is presented diagrammatically.

Force Spent for Roughing the Surface in the Repair of Tires and Tubes. I. S. Levitskii, *Kauchuk i Rezina*, 7, 67-68 (1940). **SN-95.**

Mathematical formulae are given for calculating the force spent in roughing the surface when using round or cylindrical rasps or grinding stones.

Accelerated Vulcanization of SK Rubber at Elevated Temperatures. A. P. Pisarenko, *Kauchuk i Rezina*, 8, 18-28 (1940). **S-58.**

The possibility of accelerating vulcanization of SK rubber by applying elevated temperatures was studied in a number of experiments to determine the effect of various factors. The uniformity of vulcanization at elevated temperatures was determined on two recipes, of which one contained sulfur 1%, thiuram 0.08%, and Captax 0.25%, and the other contained sulfur 0.55%, thiuram 0.02% and Captax 0.25%. The vulcanization temperature was 150, 175, 200, and 225° C. The vulcanization time varied from 1 minute to 30 minutes, depending on the temperature.

The mixes which contained the usual amount of accelerators were somewhat over-vulcanized. The mixes containing less than the normal amounts of sulfur and accelerators were better than the ones containing the normal amounts. Generally the amount of free sulfur in mixes vulcanized at elevated temperatures is insignificant. The evenness of vulcanization at 200° C. is not worse than that at 150° C. Therefore it can be concluded that, when using high vulcanization temperatures, the quantity of vulcanizing additives should be reduced.

Experiments were also carried out to determine the effect of the quantities of sulfur, accelerators, and the combined quantity of both on the rate of vulcanization at elevated temperatures. In the experiments dealing with sulfur, the quantity of the latter was reduced by 15, 30, 45, and 60% of normal. (The normal mix contained 1% of sulfur). The vulcanization temperatures were 150, 175, and 200° C. For each of the mixes and for each of the temperatures the time of vulcanization varied. As the vulcanization temperature increased, the required time decreased sharply. At 175 and 200° C. the mix containing the normal amount of sulfur (1%) was slightly over-vulcanized. With a decrease in the quantity of sulfur the residual elongation increases. This is of particular value for sole rubber.

When the amount of sulfur was decreased by 45 and 60% of normal, the breaking strength decreased somewhat, but the elasticity product and the residual elongation increased considerably. This action is taken to indicate under-vulcanization. Also, as the quantity of sulfur decreased, the extent of swelling of the vulcanizates in benzene increased. The extent of swelling did not depend on the vulcanization temperature. The experiments on the effect of accelerators showed that when vulcanization temperatures of 175 and 200° C. are used, vulcanizates are obtained exceeding standard requirements (for sole rubber) even without any accelerators. Using the normal quantity of sulfur and carrying out the vulcanization for five minutes at 200° C. an entirely satisfactory product is obtained; whereas 18 minutes at 150° C. results in an almost uncured rubber. Best results were secured when the thiuram was reduced by 75%, Captax by 60% and the vulcanization temperature was 175° C. Decreasing the quantity of accelerators slows down vulcanization. However, when high temperatures are used even without accelerators, the time required does not exceed that accepted for 140° C. Lowering the quantity of accelerators does not affect the extent of swelling in benzene of rubber vulcanized at 175 or 200° C. Simultaneous reduction of the quantity of all additives (sulfur and accelerators) does not affect the physical and mechanical properties of the product if the vulcanization is carried out 200° C. However, simultaneous reduction of all the additives reduces the rate of vulcanization considerably. When the sulfur and additives were reduced to a minimum, and vulcanization was conducted at 150 or 175° C., the physical and mechanical properties of the vulcanizate worsened. Quite possibly, this result was due to under-vulcanization.

Best results with respect to time required for vulcanization and with respect to physical and mechanical properties gave mixes in which the sulfur content was reduced by 30%, thiuram was reduced by 50%, and Captax by 40%. The mix contained sulfur 0.70, thiuram 0.04, and Captax 0.15%. This mix vulcanized for 18 minutes at 150° C., had a tensile strength of 58.5 kg. per cm. sq. (830.7 lbs. per sq. in.), relative elongation 252.5%, set elongation 9.3%, Shore hardness 65. Vulcanized for 12 minutes at 175° C., it had a tensile strength of 56.8 kg. per cm. sq. (806.6 lbs. per sq. in.), relative elongation 247%, set elongation 8.0%, and Shore hardness 67. Vulcanized for five minutes at 200° C., it had a tensile strength of 56.4 kg. per cm. sq. (801 lbs. per sq. in.), relative elongation 238.0%, set elongation 7.8%, and Shore hardness of 65.

(*To be continued*)

Record Production and Consumption of Barite

Record quantities of barite were produced and consumed during 1944, according to the Bureau of Mines, United States Department of the Interior. The output was 515,136 short tons, 20% over 1943 production and 7% greater than in 1941, the previous record year. Consumption totaled 595,563 tons, including 67,888 tons imported. Of this consumption, 10,000 tons were used for rubber filler. Sales of ground and crushed barite reached a new record of 344,757 short tons, a 66% increase over 1943. War demands for barium chemicals drove production to the highest levels possible with barite and manpower shortages. The demand for lithopone was greater than the supply, and 726 short tons were consumed by the rubber industry.

The Use of Gas for Carbon Black[1]

E. M. Eckhart[2] and Ira Williams[2]

CARBON black is a rubber reenforcing agent for which there is no substitute. It is now more of an essential material than formerly because synthetic rubber of the GR-S type can be satisfactorily vulcanized to give maximum resistance to abrasion and wear only in the presence of carbon black; even low-grade furnace carbons are superior to other rubber reenforcing agents. The introduction of synthetic rubber has greatly increased the demand for carbon black because every pound of GR-S rubber requires carbon to produce a good vulcanizate; while channel carbon is used in natural rubber only when abrasion resistance is required, such as is the case in tire treads.

The 1944-45 Shortage

In 1944 many newspapers—some of which had not been complimentary to carbon black in the past—carried news items that expressed the alarm felt in high government and military circles over a carbon black shortage then developing. Official Washington was of the opinion that unless something was done quickly to avert the threatened shortage, particularly in the grade known as channel black, this country was inviting military disaster.

Through the combined efforts of the Texas Railroad Commission, the officials of two or three other states, the Army, the War Production Board, and the carbon black industry, the crisis was averted. Government-financed plants and additional privately financed plants were authorized; old facilities were rehabilitated, and new facilities rushed into production; casing was secured from the mills for additional gas wells, and new trunk pipe lines were built for old plants that were short of gas. Time was short, and labor scarce, and it took close cooperation, high priorities, and endless expediting, but additional carbon black production was secured in time to enable the motorized armies of Eisenhower to continue to roll victoriously forward on wheels to a successful conclusion of the war against Germany.

Carbon black plant capacity now totals at least 600,000 tons annually—double that of any year prior to the war—and this volume is not far from the estimated 1946 requirements. Two-thirds of this production is centered in Texas, with Kansas, Louisiana, Oklahoma, New Mexico, and California sharing the balance. A large proportion of the Texas production is in the Panhandle.

[1] From a brief presented to the Federal Power Commission, in the matter of Natural Gas Investigation, Docket G-580, Feb. 5, 1946.

[2] Vice president and director of research, respectively, of J. M. Huber Corp., 460 W. 34th St., New York 1, N. Y.

Fig. 1. Carbon Black Manufactories—Channel Black Plant, Left Foreground; Furnace Black Plant, Background; Quonset-Type Warehouse, right; and Covered Hopper Cars for Bulk Shipment, Foreground

Robert Mertens Photo

History and Development of the Industry

When the carbon black industry first came into Texas, the only gas which could be used in the manufacture of carbon black was casinghead gas. It was then and is still lawful to pop into the air or burn in flares certain quantities of gas produced with the oil from oil wells, and it was this gas which was first used.

By 1928 it became evident that the Panhandle gas field produced both sour and sweet gas. Roughly one-half of the area included within the Panhandle Field would produce sour gas and one-half sweet gas, though the field was what has been commonly referred to as a common pool or reservoir. The sweet gas had a market as fuel and for other similar purposes, but the sour gas was without market and had no use or value in the field. Owing to the obvious injustice of permitting the field to be drained without affording the sour gas landowners and leaseholders some outlet, the legislature of Texas in 1929 passed a law permitting the use of sour gas in the manufacture of gasoline and allowing the residue to be popped into the air. The carbon black companies, starting their mass migration from Louisiana, began at this time to use a small portion of this residue gas in the manufacture of carbon black.

In 1935, Texas House Bill No. 266 was passed by the legislature prohibiting the popping of residue sour gas into the air, but in conjunction with Senate Bill 407, permitted the use of sour gas in the manufacture of gasoline, provided the residue was utilized in the manufacture of carbon black or for other useful chemical purposes. The law placed a ceiling of 750,000,000 cubic feet per day which could be withdrawn for carbon black purposes from any common reservoir. Today sour gas allowables are prorated by the Texas Railroad Commission on an equitable basis among all the sour wells in the field so that each well shares in the market demand.

There are three general processes by which carbon black is produced from natural gas: namely the thermal decomposition method, the impingement method, and the so-called furnace method.

The thermal decomposition method was started in the Monroe Field of Louisiana in 1919. This process burns natural gas against brick checkerwork until the bricks are at a high temperature. The air supply is then shut off, and natural gas is cracked into hydrogen and carbon by blasting against the heated bricks. The yields are sometimes as high as nine pounds or more per thousand cubic feet, but this type of carbon black has limited sales and is of value chiefly for such special uses as in inner tubes and mechanical goods. During the war productive capacity of thermal black, never large, was increased considerably.

The impingement method for producing carbon black was first practiced in West Virginia and Pennsylvania some 70 years ago. There were originally various types of impingement methods used, but the common one to-

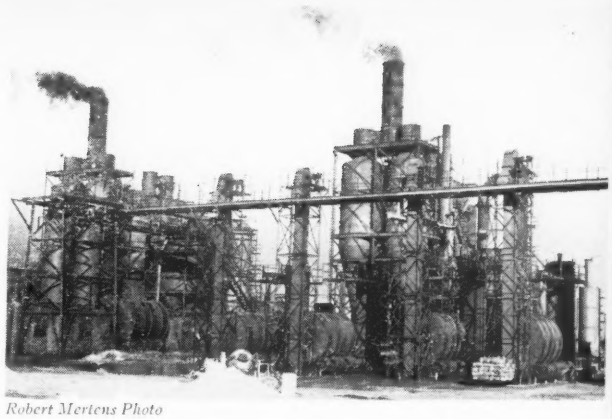
day is known as the channel process. In the channel process, natural gas and air are burned in so-called hothouses which contain a table of reciprocating seven-inch or eight-inch channels spaced an inch or two apart, which run the length of the houses. Centered about three inches below the channels and running parallel with them are burner pipes in which, every four or five inches, are lava tips through which 50 or 60 cubic feet of gas per tip is burned every 24 hours. The black, produced through incomplete combustion, is deposited on the channels and is scraped off, collected, and processed by continuous methods. Figure 1 shows channel black plants in the left foreground and furnace black plants in the background.

The small number of pounds of channel black produced per thousand cubic feet of gas does not mean that the process is extremely inefficient. It is true that the average gas of about 1025 BTU's used for the manufacture of carbon black contains approximately 32 pounds of carbon in each standard 1,000 cubic feet of gas. However natural gas, and particularly methane, is a stable chemical substance, and it is impossible by any means to secure the total amount of carbon without the expenditure of external energy. A considerable portion of the natural gas is used as fuel to supply energy for the separation of carbon from the remainder.

Relatively low yields of various channel black grades are caused to a considerable extent by the conditions which must be imposed to produce channel quality carbon. At least two conditions must be met. First, the carbon must be produced at a sufficiently high temperature so that the hydrocarbon decomposes quickly. Second, the carbon must be removed quickly from the cracking zone in order to prevent the growth of the carbon particle to a large size and to prevent the complete decomposition of the organic material of which channel black is at least partly composed. The temperature of a flame for producing channel black lies between 1400 and 1450° C.[3] The time during which the hydrocarbon is subjected to this temperature in the flame lies between 0.005 and 0.01 second.

The utilization of the hydrocarbon in the channel black process is approximately as follows, assuming a temperature of 1420° C. and an exposure time of 0.01 second. First, sufficient gas is burned to raise the combustion gases and the remaining unburned hydrocarbon to the required temperature. Part of the remainder is available to produce carbon, but only part, because the decomposition of methane is accompanied by the absorption of large amounts of heat which can come only from burning part of the remaining methane. Approximately 40% of the original gas must be burned to supply heat to raise the mass to the required temperature and to crack a portion of the remaining 60%. The rate of decomposition of methane is well known.[4] At 1420° C. a contact time of 0.01 second will decompose about 24% of the methane. Carbon should then be obtained from 24% of 60% or from 14.4% of the original methane. If the total original gas contained 32 pounds of carbon we should obtain 4.6 pounds theoretically. In the newer plants it is quite easy in commercial production to obtain a yield of 1.6 pounds by the channel process. This is about 35% of the carbon expected in such a process.

In the early Twenties in the Monroe Louisiana Field experiments were carried on with another process from which the present so-called furnace plant gets its name. After considerable sums had been spent and many failures and discouragements overcome, the first plant began to operate successfully around 1928, and about the same time another furnace plant began to operate in the Texas Panhandle. These plants produced a so-called semi-reenforcing black in special furnaces by partially burning the gas in an insufficient supply of air. The black from these two original plants is now collected by means of electrical precipitators, as is the black from the new furnace plants that were built during the war.



Robert Mertens Photo

Fig. 2. Furnace Black Plants—Pelletizers and Precipitators in the Foreground

The output from the two original furnace plants received its first real sales demand when the manufacturers of rubber garden hose discovered they could eliminate the fabric in the hose if they used the type of black these plants produced. Later on other mechanical rubber goods became an additional outlet; however the prewar market for semi-reenforcing black was under 50,000 tons annually.

When war came to the United States, and with the bulk of rubber imports cut off, this country was faced with the life or death necessity of having a substitute ready before the stockpiles of crude rubber were exhausted. It was a job that had to be done quickly, and it was accomplished on schedule. But GR-S and other synthetic rubbers are of limited value without carbon black, and since a given quantity of synthetic rubber required about twice as much carbon black as an equivalent quantity of crude rubber, particularly for tires, it was necessary for the carbon industry to expand its facilities greatly. Owing to the smaller quantity of steel required, the higher yields obtainable, and the shorter time involved, the War Production Board, despite many rubber industry protests, had no alternative but to authorize new furnace plants, and so many plants were built that the productive capacity now equals or exceeds that of channel plants and is several times what it was before the emergency expansion program started. Figure 2 shows one view of two furnace units of the J. M. Huber Corp. at Borger, Texas. GR-S, unlike crude rubber, requires carbon black in the carcasses of tires, and a semi-reenforcing black serves this purpose well because it is easy processing and helps to minimize the heat which GR-S generates. By using as high as 50 parts of GR-S, a satisfactory carcass can be built, but this tremendous loading in a stock, where little or no carbon black had formerly been used, is one of the reasons for the unprecedented demand for black.

The production of carbon by the furnace process is not subject to the short limitation of the channel process. The decomposition of methane at a temperature of 1420° C. is substantially complete in 0.5 of a second. The contact time in furnaces can hardly be reduced below this time. In this case more of the portion not required for fuel will be cracked, and slightly more of this portion must be burned to supply the necessary heat. About 50% of the gas must be burned, leaving carbon available from half of the original gas, or a theoretical yield of 16 pounds per 1,000 cubic feet of average gas.

[3] This temperature agrees well with temperatures found by others in flames: F. Kurlbaum, *Phys. Zeit.*, 3, 167 (1932); H. Hottel and H. F. Broughten, *Ind. Eng. Chem. (Anal. Ed.)*, 4, 166 (1932).

[4] Kassel, *J. Amer. Chem. Soc.*, 54, 3949 (1932).

The actual amount of carbon obtained by a furnace process depends on the quality being produced, but a high-quality grade recovers only about five pounds; while nine pounds of a black which imparts lower reenforcement can be obtained from gas of average richness. The efficiency of these two grades is, therefore, about 31% and 56%, respectively. In this case, only the lower yield carbon is suitable for rubber articles requiring abrasion resistance and in such application is inferior to channel black.

During the war, owing to the fact that the demand for channel black was not being met, it was necessary to try to produce better grades of furnace black which could be used to stretch out the dangerously dwindling channel black stocks. Furnaces are now producing four grades, one of which approaches some of the physical properties of channel black. But the yield per thousand cubic feet is so low as to give evidence, at least under present knowledge, that if channel black is ever matched in furnaces, the yield would be little better than the yield in modern channel black hothouses, and the overall production per unit so low that the investment cost per thousand pounds of black would be uneconomically high. One furnace plant is now in operation which uses oil instead of gas. The carbon obtained by this process has physical properties similar to some other furnace plant blacks and is being widely used, even though its future, like the future of all other new blacks, is unpredictable.

Efficiency of the Carbon Black Processes

Computations were given above showing the percentage of efficiency in recovering the available carbon in both the channel and the furnace processes. Natural gas is frequently used as a fuel in other applications besides the production of carbon, but the portion consumed as fuel for the production of carbon black is used under the best possible conditions of heat transfer since it is directly in contact with the gas to be heated. The efficiency of this step is greater than that for any other operation which uses gas for fuel, as illustrated by the following examples.

The efficiency of several operations which use natural gas or similar hydrocarbons is as follows:

Most industrial boilers operate at an efficiency of about 80%.[5] Certain installations may operate at an efficiency as high as 90%.

Triple expansion steam engines have an efficiency of about 20%.[6] Gas fired into a boiler could deliver through such an engine 20% of 80%, or about 16% of the energy available in the fuel.

A very large steam turbine with an efficiency of 38% operating through a superior boiler with an efficiency of 90% would deliver 34.2% of the energy available in the fuel.

Gas turbines operate at an efficiency of about 29%.[7]

Automobile engines in reasonably good condition operate at about 20% efficiency;[8] however the average for all cars is very much lower.

An ordinary gas range, while boiling water, operates at an efficiency of about 25%.[9]

The overall efficiency of a steam locomotive is of the order of 6%.[10]

By comparison, it is apparent that the overall efficiency obtained in the production of carbon by either the channel or furnace process is good. It is unfortunate, particularly for the channel black industry, that the inefficiency of the process shows up as clouds of smoke while the inefficiency of most other uses of natural gas is not noticeable.

Economics of Carbon Black Use

Our high-speed cars are vehicles of death unless they are mounted on quality tires. With 15 pounds of carbon black in a set of passenger tires, we can figure on the tires giving 20,000 safe and satisfactory miles. It takes about 7,500 cubic feet of gas to produce 15 pounds of channel black. It will require about 1,000 gallons of gasoline to wear out these tires. Thirty cents worth of gas converted into 75¢ worth of carbon black will move a car safely at high speeds as far as $200 worth of gasoline will take it.

The use of channel carbon in tires is a decided economy. Zinc oxide, which was once used as the preferred rubber toughener, requires more than three times the number of pounds, costs about twice as much per pound, and produces a tire that will wear scarcely half as long. Good quality clay sells at a lower price, but requires more pounds and produces a greatly inferior tire. Even the best furnace blacks are still inferior to channel black in producing tear and abrasion resistance. Even if the future price structure of pigments like zinc oxide, clays, and furnace black should be such that a few cents per tire could be saved by substituting one of them in the tread, premature tread failure would destroy the labor and the material which have entered into the whole tire.

Carbon black is the only known pigment which can be used in the manufacture of news ink for today's high-speed presses, and this use of black, though much smaller than the outlet furnished by rubber, is the second largest market that the industry has; and here, too, channel black is superior to other grades, just as it is for dozens of less important purposes.

Prior to the war, which means prior to synthetic rubber, about 80% of the carbon black manufactured and used was channel black. It is significant that at the end of the war the demand for channel carbon did not decrease, but has in fact increased, while the continued heavy demand for furnace black is due in part to the shortage of channel black.

The Future of Carbon Black

There are many factors involved in the future use of carbon black and the kinds and grades which will be demanded by the consumer. If answers could be given to several questions, predictions would be more reliable. It is the understanding now that most GR-S operations, with the exception of plants using butadiene, produced from alcohol, expect to run at or near capacity for at least a year, and that this production will be increasingly augmented by crude rubber. The highest prewar world consumption of rubber in any one year was slightly over one million long tons, and some predictions are that when enough rubber is available, world consumption will reach 1,600,000 long tons a year. As crude rubber begins to show ability to fill these requirements alone, there will doubtlessly be a gradual closing down of some of the GR-S plants, particularly the high-cost ones. Until an accurate answer is given to the question of how much GR-S will be used and how much crude rubber, all questions regarding the future of the various carbon black grades must remain unanswered. More carbon black will be used, and a substantial part of it will of

[5] S. Mark "Mechanical Engineers Handbook," Fourth Ed., p. 1165, McGraw-Hill, New York (1941).
[6] R. T. Kent, "Mechanical Engineers Handbook," Eleventh Ed. Power, Sec. 7, p. 20, John Wiley & Sons, Inc., New York, (1945).
[7] *Industry and Power*, 49, 72 (1945).
[8] N. G. Shidle and T. A. Bissell, "Fraser-Jones, Motor Vehicles and Their Engines," Third Ed., p. 9, D. Van Nostrand Co., Inc., New York, (1927).
[9] Determined in the laboratories of J. M. Huber Corp.
[10] Mark's, *opus cit.*, p. 1482.

necessity be furnace black, if a large volume of GR-S is retained. Relative prices of GR-S and crude rubber will affect the picture as well as further improvements in GR-S quality, to say nothing of what attitude we take toward the almost certain contention of our friends, the British and the Dutch, that their economics will seriously suffer unless they can again supply the enormous American rubber demand. In any case one good guess is that some of the furnace plants will turn out to be War Babies. But in the meantime the highly skilled technical men in the industry will not cease their efforts to increase channel black yields and to produce in furnaces a black with the same physical properties as channel black, but with better yields than channel black.

Natural gas will probably continue to be the main source of carbon black. Other gases such as acetylene could be used, but since natural gas will probably become a main source of acetylene, its use in the manufacture of carbon black will not be practicable. Any normally gaseous hydrocarbons such as the propane and the butane which occur in natural gas will produce somewhat higher yields of carbon than methane. The present practice of stripping natural gas which contains less than one gallon of liquid hydrocarbons per 1,000 cubic feet is in general not economically sound. Oils can be used to produce certain types of furnace black, but at present only by-product petroleum substances of a refined nature are used.

The carbon black industry has been diligent in its effort to improve its processes. This fact is evidenced by the more than 175 United States patents dealing with improved products, uses, methods, and apparatus connected with carbon black which have been issued since 1930. The channel process has been improved until it is now possible to construct plants which will produce more than two pounds per 1,000 cubic feet of 1025 BTU gas. Furnace processes have been developed which produce carbon greatly superior in reenforcing qualities to that produced by the original furnaces.

The prices paid for natural gas for channel black use have been too low in the past owing to the low prices of channel black and owing further to the low sales value of the distress gas, because of inadequate markets; however this condition is fast being corrected, and the tendency in the Texas Panhandle is to set up a formula for paying for sour gas on the basis of the price for sweet gas less the cost of sweetening.

Conclusions

If the carbon black industry is to continue to supply the demands for carbon, it must eventually be permitted to compete in the open market for gas. There is no longer a logical reason why the channel black industry should be restricted to the use of sour gas. Since the development of adequate methods for sweetening, the value of sour gas is the value of sweet gas less the cost of removing the hydrogen sulfide. Sweetened gas is satisfactory for all industrial and domestic uses, and since pipe lines are available to the sour gas areas, the carbon industry must soon compete directly with all other users of gas. If legal obstacles to the use of sweet gas are removed, this action will tend to cause a migration of the carbon industry as small units into small and isolated fields or areas which are not serviced by pipe lines. However only a limited amount of gas of this type will be available, and much of the gas must still come from the same fields which supply pipe lines. When the carbon industry can no longer sell its product at a price which will permit competition with the pipe lines for natural gas, then it will cease to produce.

Synthetic Rubber Situation

(*Continued from page 365*)

duty as manager. He will be followed by the others in rotation. R. W. KixMiller is assistant manager, with P. S. Greer in charge of the Polymer Development Branch dealing with pilot-plant and plant experimental work, and with R.F. Dunbrook in charge of Polymer Research dealing with fundamental research, laboratory investigations, etc. Both branches have university research contracts to administer. Dr. Dunbrook is being recalled by Firestone next month, and A. M. Borders, of Goodyear, will take over. H. L. Fisher of this group is a part-time consultant in Polymer Research.

Summary and Conclusions

We could apparently use more GR-S in 1946 than there is any prospect of our producing; and while the Batt Committee has recommended at least 250,000 tons of GR-S be kept in production for the future, there appears to be no prospect of that being nearly enough in 1947. Given a couple more years of production at high rates in which to make improvements, I doubt if natural rubber, unless it sells for less than GR-S, when it comes back in quantity, will be able to displace the improved GR-S from passenger-car tires or from the majority of non-tire uses for which types have or will have been developed particularly suited to the requirements of the end use.

The acrylonitrile rubbers and neoprene held a place at prices far higher than current ones and are firmly established. Any further decrease in prices will increase their use as general-purpose rubbers.

Butyl, of course, makes better tubes that natural rubber, owing to air retention, and could probably command a premium.

It has been frequently and widely stated that our synthetic rubber industry is overbuilt for the future. But we are already using rubber in 1946 at a rate of 1,000,000 tons per year. Many of the potential improvements in GR-S quality and processability involve a decreased production rate per unit of copolymer plant equipment, and the production of numerous different varieties reduces total capacity. These factors and the rapid growth of consuming capacity and end use demand are already shrinking the gap between total productive capacity and total consumption. With a stable and predictable price, the uses of rubber will undoubtedly expand.

Though largely a product of war's necessities, the American synthetic rubber industry appears already to be well established. Starting from scratch and with a high standard to shoot at, the chemists, engineers, and other technologists of the synthetic rubber and the rubber goods industries in little more than three years have made progress that took as many decades with natural rubber. How much further can they go? Your guess is as good as mine.

THE RUBBER INDUSTRY CONSUMED 51,833 SHORT TONS of talc, pyrophyllite and ground soapstone in 1944, against 48,994 tons in 1943, according to the United States Bureau of Mines. These gains were recorded despite the fact that mined production and sales of these materials, from the overall picture, declined during 1944 from the high levels of 1943. A total of 418,228 short tons of talc, pyrophyllite, and ground soapstone were produced during 1944, of which 398,863 tons were sold by producers, and an additional 8,478 tons imported for consumption.

EDITORIALS

Research on Synthetic Rubber

ONE of the problems of policy that the Batt Inter-Agency Committee on Rubber is finding difficult of solution is that of research on synthetic rubber and how, if the plants continue to be owned by the government for the next two or three years, to insure the same vigorous type of research that would be carried on if the plants were privately owned by several competing firms.

One of the major stumbling blocks is the existence of the "Cross Licensing Agreement—Buna Rubber," which requires that all parties signing the Agreement must grant a license under all of their patents "relating to manufacture, use and sale of Buna Rubber and to manufacture, use and sale of compounds of vulcanizates of the same, insofar as such patents are based upon inventions made and under the control of the licensor prior to the expiration of six months after the cessation of hostilities with Germany, Italy, and Japan." It is also stated that: "Licenses and sublicenses endure for the full unexpired term of the patents, but do not include releases from past infringement. The right in Rubber Reserve Co. to sublicense others is limited to the War Period, except with respect to lessees and purchasers of government-owned plants; such lessees and purchasers, if acquiring sublicenses after the War Period, must give licenses and licensing rights on inventions made and within their control up to effective date of accepting such sublicenses."

It is suggested that now that the war is over, actually if not technically, reconversion would be aided and vigorous research on synthetic rubber assured if this "Cross Licensing Agreement—Buna Rubber" was eliminated at once. Research on Buna synthetic rubber could then be carried out by private industry and the government agencies in competition with each other with only the normal peacetime patent laws as a governing and regulating force. The government and the security of the nation would still be protected, and private enterprise would have all the incentive needed to continue and expand its own research activities in the Buna synthetic rubber field.

If the results of research financed by private funds developed a patent or patents for synthetic rubber or its use superior to anything now in existence, the government, during peacetime, should purchase a license or licenses and pay royalties for the use of such developments in its plants. During a war period, and until the present war period is officially terminated, the government already has the power to use such developments, if needed. On the other hand, if the most outstanding developments resulted from work financed by the government, if private industry desired to use these developments, it should purchase the licenses from the government and pay the royalties into the U. S. Treasury.

Licenses that have already been granted under the existing Agreement should be continued royalty-free for the life of the patents.

It is axiomatic that in this country the sooner the government gets out of the rubber business, the sooner major peacetime progress and development will take place, but in the business of research on synthetic rubber, the government will and should continue this type of activity because of the national security minimum production of synthetic rubber required, if this research is in competition with research by private companies, either individually or by groups.

"The Turning Point"

AS THE *New York Herald Tribune* stated in an editorial under the above title on Sunday, May 26, "Quite apart from the immediate effect of President Truman's speech on Friday night (May 24), it unquestionably marks a major turning point in American labor policy." This editorial also adds: "No thoughtful American can view the prospect ahead without apprehension. . . . The labor pendulum, once reversed, may swing back too far; conflicts even greater than those now raging may be provoked. . . .

"Nevertheless, the blame for this unhappy situation can be placed squarely upon the leaders of organized labor and upon those politicians who have encouraged them to go beyond the conservation of labor's great gains, beyond the claims for legitimate adjustment of wages and working conditions after the dislocations of war, beyond true collective bargaining into a field of radical experimentation backed up by the naked force of the strike weapon."

The editorial then goes on to review the damage that has been done to this nation's citizens and the national economy and then calls upon labor to reassert its good sense before it has "not only wasted the nation's economy, but its own strength irretrievably."

In this connection it was pointed out in these columns in July, 1945, that not only was there a need of organized labor to put its own house in order, but there was an urgent need of enactment of a comprehensive, non-vindicative, fair national labor law such as the Ball, Burton, Hatch Bill introduced at about that time. The sponsors of this bill pointed out that the situation had "the makings of a knockdown, dragout finish fight" unless the government stepped in with a sound labor relations policy.

There was no action on the Ball, Burton, Hatch Bill but the "finish fight" did take place. Now most of the important provisions of the earlier bill have been incorporated into the bill introduced into the House of Representatives by Mr. Case of South Dakota on January 21, 1946. The Case Bill has been passed by both the Senate and the House and is awaiting final action by President Truman. The President has not given any indication that he will sign this bill and in view of the fact that he has recommended that committees be appointed in both Houses of Congress to study the whole subject of labor relations "afresh" and "to report within a period of six months," seems to show that he feels the Case Bill does not yet represent the best in permanent legislation.

It is impossible to overlook the fact that action on the above-mentioned Ball, Burton, Hatch Bill has been prevented for almost a year and that if it had been passed last year, "the turning point" in American labor policy might have occurred much earlier with consequent immeasurable benefit to labor, management, and the country as a whole.

The President's emergency labor legislation seems unlikely to become a law. Must we now wait another year for a sound, "long range" labor policy while our progress along the road to permanent postwar prosperity continues at its present halting rate?

Scientific and Technical Activities

N. Y. Group Spring Meeting Held; Outing Planned for June 21

THE spring meeting of the New York Rubber Group was held at the Hotel McAlpin, New York, N. Y., May 3 with about 300 members and guests present. George J. Wyrough, chairman of the Group, presided and introduced the speakers. Those at the afternoon program were W. E. Cake, assistant managing director of the plantations division of the United States Rubber Company, who spoke on "The Natural Rubber Situation," and A. E. Boss, manager of pigment sales, Columbia Chemical Division, Pittsburgh Plate Glass Co., who talked about "The Synthetic Rubber Situation." Following dinner, W. James Sears, director of rubber division, Civilian Production Administration, discussed "Issues Involved in Disposal of Synthetic Rubber Plants." The meeting was then entertained by H. Walter Grote, director of export, Philblack Division, Phillips Petroleum Co., who presented a most enjoyable demonstration of mind-reading.

The Afternoon Program

The talk by Dr. Cake was similar to the one presented before the Philadelphia Rubber Group on March 8, which was published in our May issue.[1] In addition some of the more recent information presented included the statement that under the operation of the Malayan Rubber Estates Owners' Co., natural rubber production on the U. S. Rubber plantations in Malaya will approach 50% capacity for the end of this year.

"Actual production on company plantations in Malaya," Dr. Cake said, "reached 411,982 pounds during the first quarter of 1946. Quarterly production is expected to rise to 2,930,000 pounds during the fourth quarter of the year. Estimated total output for the year is 8,400,000 pounds. This production of natural rubber is entirely under the supervision of the MREOC, formed under the British Military Administration to supervise the initial rehabilitation of Malayan rubber estates. It cannot be considered as private enterprise," it was added.

In response to a request from the audience, Dr. Cake also provided some interesting sidelights on his personal experiences and those of his associates during their three-year internment in Japanese prison camps.

The talk on "The Synthetic Rubber Situation" by Dr. Boss, who recently returned to his company after serving with the Research and Development Section of Rubber Reserve during the war years, is published in this issue of INDIA RUBBER WORLD.[2] Information on the present personnel of this Section, of which Dr. Boss was manager upon his retirement, is contained in this paper.

Sears on Plant Disposal

Mr. Sears, in his talk on "Issues Involved in Disposal of Synthetic Rubber Plants," first mentioned the outstanding progress made by the rubber industry in its reconversion effort and stated that the production of rubber goods during the first quarter of 1946 was the highest in the history of the industry and that production during March, 1946, exceeded that of June, 1941, the previous high.

This speaker reviewed the government's activities in rubber at the present time, referring to the ownership of the plants for the production of GR-S, GR-M, and GR-I; the control and allocation of natural rubber; the control of the amounts of natural and synthetic rubber in manufactured products by virtue of Rubber Order R-1; and the control of the price of natural and synthetic rubber and its products. The direction and financing of research programs on synthetic rubber were also mentioned.

In order to try to answer the question as to how long the government should continue its controls, Mr. Sears first stated that he believed that this condition depended on the availability of natural rubber, and then presented estimates of natural and synthetic rubber consumption and year-end inventory for the next three years to provide a background for determining when natural rubber imports would approach a prewar availability figure. If total consumption during 1946 is taken as 900,000 long tons, and natural rubber inventory at the beginning of '46, at 125,000 long tons, and if 300,000 tons of natural rubber are imported, with a requirement for a year-end inventory of 200,000 tons, then 675,000 tons of synthetic rubber are necessary, according to Mr. Sears. For 1947, total consumption is estimated at 875,000 tons, and natural rubber imports are estimated at 450,000 tons. If a year-end inventory of 300,000 tons is to be achieved, 525,000 tons of synthetic rubber will be required in 1947. For 1948, total consumption is reduced to 800,000 tons and natural rubber imports may be 600,000 tons. If the year-end inventory is set for 400,000 tons, this in turn will mean the production and use of 300,000 tons of synthetic rubber, it was said. It was pointed out that there still are many uncertainties in the estimates of natural rubber imports.

Based on the above figures, allocation of natural rubber and the continuation of product specifications by R-1 might be necessary until June 30, 1948, Mr. Sears said. The authority for such action, however, is dependent on legislative action in extending the Second War Powers Act beyond its present expiration date of June 30, 1946, or the passage of substitute legislation pertaining to rubber, he added.

Reasons for maintaining government control during the "short-run" period of natural rubber shortage were next explained. Allocation was considered the only fair method of handling the insufficient supplies of natural and GR-I rubbers. Product specifications were indicated as the only way to prevent large companies from obtaining a competitive advantage over the smaller companies where the latter by virtue of their lesser degree of diversification could not use all their natural rubber in a given product to achieve high quality. Government control and allocations are the only means of equitably distributing the various grades of natural rubber. If synthetic and natural rubber must be used jointly, under mandatory regulations, during the next two or three years, this use should be at a fixed controlled price. Mr. Sears admitted that the present "Compounding" Agreement of the research program of the Office of Rubber Reserve, pertaining to the development of end-product processing, might retard the research effort of the participating companies, but expressed the hope that a solution might be found to this perplexing problem.

On the major item of the disposal of the synthetic rubber plants to private industry as recommended by the Batt Committee, it was stated that such disposal during the "short run" should be compatible with the need of continued government allocation and price control. If these plants were in private hands and a price differential in synthetic rubber between various producers developed, there probably would be a demand from industry for a separate and fair allocation of the higher-priced material. This could be solved by the use of a government buying and selling pool or continued price control. Since the production of synthetic rubber must be maintained at a definite level during the period of natural rubber shortage, sales contracts for synthetic plants would have to include a requirement for operation at a predetermined level.

Reference was made to the recommendation of the Batt Committee that government control should be continued until natural ruber was in ample supply. Mr. Sears said that the Civilian Production Administration interpreted this as the time when there was in sight through firmly projected imports enough natural rubber for all general-purpose uses for a year and four to five months.

Some of the problems involved in the long-term recommendations of the Batt Committee that the production and use of one-third of our general-purpose rubber requirements be synthetic rubber (GR-S) regardless of cost, also were considered by the speaker. With ownership of the synthetic plants in private hands, a dilemma arises as to how to assure the minimum usage of 250,000 long tons of synthetic rubber recommended by the Committee without government intervention, and how to be sure this usage is in products important to the military as well as the civilian consumer. CPA industry technical committees have agreed with the Batt Committee recommendation that consuming plants be required to use one-third of general-purpose rubber as synthetic (GR-S), and these committees are not in favor of depending on voluntary use, but believe government control and regulation necessary, considering present knowledge regarding the relative quality of GR-S. Other means of insuring this minimum usage of synthetic rubber, particularly if it was priced 5¢ a pound above natural rubber, including a tariff on natural rubber, import quotas, sub-

[1] P. 207.
[2] P. 363.

sidies, excise taxes, etc., were mentioned, but were not considered very attractive. It was pointed out that GR-S of equivalent quality would probably be competitive with natural rubber regardless of price and that, since it is argued that private operation of synthetic plants was the best way to insure vigorous research to achieve this objective, a method must be found to dispose of the plants to private companies and at the same time provide maximum national security in rubber with the minimum of government intervention.

Mr. Sears outlined some of the terms of the disposal of the synthetic plants that were felt to be of the greatest importance. One of the primary requisites was a reasonable rate of purchase, and another was that the sale or lease should be to qualified producers from whom the required minimum output would be guaranteed. It was also stated that the method of disposal should avoid the formation of a monopoly and that a recapture clause should be included in the sale or lease contract. Therefore any method of disposal will, in effect, violate the basic concepts of free enterprise, since any and all methods must enforce use of the facilities for producing at least 250,000 tons annually of synthetic rubber, and the private owners will have to live by and with government control and use of the rubber made.

The speaker said that he could not answer the question as to when was the best time or what was the best method of disposing of the government's synthetic rubber plants, but he felt that if by June 30, 1948, there was developed a general-purpose synthetic rubber equal or superior to natural rubber, the problem would be much easier to solve. With such development synthetic rubber would be competitive; strategic requirements would be satisfied voluntarily; all consumers would have a free choice of materials; private operation of synthetic rubber facilities would be profitable and desirable, and the government could get out of the rubber business. Until a sufficient volume of production of synthetic rubber to satisfy this country's long-term strategic requirements is consumed voluntarily by private enterprise, government control and operation of the synthetic plants might prove to be necessary, Mr. Sears concluded.

Outing Plans

In the absence of P. Murawski, chairman of the outing committee, Peter Pinto, secretary of the Group, reported on the plans for the summer outing to be held on Friday, June 21, at Blasberg's Cove, Hawthorne, N. J. Announcements to be mailed to the members, including a map and directions for reaching Blasberg's Cove, were indicated as being prepared. The master of ceremonies is to be Jerry Provost, and there will be many events scheduled. Boccia will be in charge of Jim Carroll; horseshoes, Bill Lamela; soft ball, Bill Ayscue; races, 3-legged, potato sack, etc., Howard Linge; darts, M. E. Lerner; and golf, Ken Soule. Arrangements are being made with the Orchard Hill Club, nearby, for golf. Prizes will be awarded for all the various contests.

Starting time for field activities will be 1:00 p.m., but sandwiches will be on sale for those who come early. The price of the tickets is $5, which includes a shore dinner to be served at 5:30 p.m. Golf charges will be extra.

A.S.T.M. Meetings

THREE technical sessions featured the 1946 spring meeting of the American Society for Testing Materials, held in Pittsburgh, Pa., February 26 and 27. Two of the sessions comprised the symposium on atmospheric exposure tests on non-ferrous metals. The largest audience, however, was present at the session on statistical quality control, where papers were presented by two outstanding authorities, Col. L. E. Simon, head of the ballistic research laboratory, Aberdeen, Proving Ground, U. S. Army Ordnance, and Joseph Manuele, director of the quality control department, Westinghouse Electric Corp.

Spring Meeting

Colonel Simon in his paper, "Dollars for Your Thoughts," stated that, in general, statistical methods offer a means of determining in an economic way: (1) what product one wants, (2) what product one should strive to get, and (3) how one can operationally verify with a chosen probability that the accepted product will meet the requirements. By taking the thought necessary to achieve these three steps, both purchaser and vendor can be saved great expense. Referring to quality control, which he would term "quality determination," Colonel Simon pointed out that with many of the present specifications the purchaser may have only a vague idea of what he needs, but by setting the level of quality high enough he may muddle through, although a satisfactory product could probably be procured for a much lower price with proper considerations. The speaker stressed the fact that the heart and soul of economic specification consists of accepting a calculated risk that the accepted product will meet the quality goal. Quality control technique, when accurately applied, should yield an assurance that the whole flow of product from a manufacturer will, with some calculated risk, meet the idea of the design specification. It samples the process rather than the product.

Mr. Manuele's paper on "Use of Statistics in Writing Specifications," in which Casper Goffman collaborated, gave a number of specific details of applying statistics. He pointed out that specifications which should define the desired quality of any product must embody accuracy. That is, they must define the desirable quality level and its permissible variation with sufficient clarity to allow definite discrimination between good and bad lots. They must furthermore permit this discrimination without 100% inspection. Mr. Manuele went on to define a number of terms used in statistical analysis with specific examples of applications.

Committee Meetings

Many important developments in the work on standards and research in materials were discussed and acted on at the some 200 meetings of A.S.T.M. technical committees during committee week, February 25 to March 1, in Pittsburgh, when registration totaled 908. As a result of the discussions, a large number of new tentative specifications and tests will be referred to the Society, and many of the committees have important changes to make in existing specifications. Many new research programs also were planned. Most of the recommendations will come up for action at the Society's annual meeting, which will take place in Buffalo, N. Y.

Considerable interest was shown in the work of Committee D-11 on Rubber and Rubber-Like Materials, as evidenced by the large attendance at the committee meetings on February 26 and 27. Seventeen subcommittees also convened. At these meetings two new subcommittees were organized, one to deal with plasticity tests, and the other with tests of resilience. The new Subcommittee on Plasticity Tests will study means and methods for the processibility of rubber and rubber-like materials, including the study of instruments now used in the industry. The new Subcommittee on Resilience Tests will develop definitions, specifications, and methods on resilience, hysteresis, and dynamic stiffness of rubber and rubber-like materials.

Besides other changes the D-11 Subcommittee on Insulating Tape recommended that consideration be given to new specifications for thermoplastic wire jackets, recommended revision of the ozone test for wire insulation, and modified the heat aging test for rubber by the test tube method. The Subcommittee on Abrasion Tests for Rubber Products presented revisions in the test procedures for abrasion resistance and tear resistance and reported on the progress of the study on life tests of rubber products. The subcommittee on hardness tests decided to prepare a method covering the use of the Rex gage, in addition to other changes and recommendations. Other subcommittees reporting progress included those on immersion tests, adhesion tests, tests of liquid rubber products, and low temperature tests. Technical Committee A on Automotive Rubber reported the completion of four new specifications for hose.

Plastics Committee

Committee D-20 and a number of its subcommittees held well-attended meetings in Atlantic City, N. J., on March 6 and 7, at which many revisions and new tentative methods were adopted. Considerable interest was evinced in the activity of the Subcommittee on Research, which is studying problems of flow characteristics and impact strength. Three papers were presented before this subcommittee: "A New Impact Evaluation," by H. M. Quackenbos, of the Bakelite Corp.; "Some Visual Data on Impact Testing," H. K. Nason, Monsanto Chemical Co.; and "New Apparatus for Film Testing," C. H. Adams, Monsanto. The committee has appointed a study committee on simulated service testing and also one to consider what work might be done in the field of ultimate consumer goods.

New York District Meeting

The New York District of A.S.T.M. met May 2 in New York, N. Y., to consider "Interesting Developments and Observations in Foreign Countries," with Myron P. Davis technical chairman. The speakers were J. R. Townsend, materials engineer, Bell Telephone Laboratories, Inc., and president of A.S.T.M., who spoke on "Communications Materials and Systems in Europe;" D. E. Douty, president of U. S. Testing Co., whose subject was "Japan, Our Foster Nation;" and W. I. White, director of research and product design, Raybestos-Manhattan, Inc., who discussed "Mechanical Rubber Goods, Reclaimed Rubber, Yarns and Fabrics." The talks were all general

in nature, dealing more with conditions in Germany and Japan, rather than with technical observations.

Buffalo Meeting

Not only will the Society's forty-ninth annual meeting, to take place the week of June 24 in Buffalo, have one of the strongest technical programs yet developed by the Society, but it will also include an Exhibit of Testing Apparatus and Related Equipment as well as a Photographic Exhibit. During the week there will also be in progress a large number of meetings of A.S.T.M. technical committees.

The advance program for the meeting follows: Monday, June 24—committee meetings morning and afternoon; symposium on bearings in the evening. Tuesday, June 25—morning and afternoon: symposium on fatigue and symposium on spectroscopic light sources; evening: technical papers on general testing methods. Wednesday, June 26—morning: symposium on testing parts and assemblies (continued in afternoon), technical papers on cement and concrete, and symposium on oil procurement practices; afternoon: presentation of report on Committee D-2 and Marburg Lecture, "Protective Organic Coatings as Engineering Materials," by J. J. Mattiello; evening: annual dinner and president's address. Thursday, June 27—morning: session of effect of temperature on the properties of metals and symposium on pH measurements (continued in afternoon); afternoon: presentation of reports of Committees A-1 to A-10, D-1, E-2 to E-7; evening: session on effect of temperature on the properties of metals, symposium on atmospheric resistance of stainless steels, and discussion on test methods for freezing and thawing concrete; Friday, June 28—morning: presentation of reports of Committees B-1 to B-9, C-1 to C-18, D-3 to D-20; afternoon: technical papers on plastics, wood, and non-ferrous metals.

Program of Canadian Rubber Division for Annual Conference

AS A part of the annual conference of the Chemical Institute of Canada, to be held in Toronto, Ont., June 24, 25, and 26, at the Royal York Hotel, the Division of Rubber Chemistry has scheduled a one-day session for June 25. A program of eight papers by leading Canadian, English, and American rubber chemists and technologists has been arranged. W. S. Richardson, president of the B. F. Goodrich Chemical Co., will speak at a luncheon on June 25.

As a feature of the general meeting of the Institute, an exhibition of chemical equipment, apparatus, products, and appliances of about 45 leading manufacturers will be provided, and also on display will be the American Chemical Society atomic energy exhibit. Other technical sessions, in addition to the program of the Division of Rubber Chemistry, will be devoted to biochemistry, chemical education, chemical engineering, protective coatings, pure chemistry, and textiles.

The titles and abstracts of the papers to be presented before the Division of Rubber Chemistry, together with their authors and their company affiliations are given below:

TUESDAY MORNING—JUNE 25

Synthetic Rubber Research in Canada. The status of synthetic rubber research in Germany and the United States, as of 1945, is outlined. A substantial portion of the German effort was directed toward fundamental research; while in the United States, since the beginning of the war period, the emphasis has been on development and applied research.

Before the war Canada had no synthetic rubber industry and had done little research in the field of elastomers. Today Canada is active. The present research organization in Canada is described, and the program to be followed is indicated. Research is being financed at Sarnia by Polymer Corp., and at the National Research Council Laboratories and six Canadian universities by grants from the National Research Council. Capital expenditures for synthetic rubber research in Canada to date approximate $350,000. The operating budget for the coming year will be in excess of $300,000. E. R. Rowzee, Polymer Corp., Ltd., Sarnia, Ont.

Elasticity of Rubber-Like Materials. The origin of elasticity in rubber-like materials is discussed from the standpoint of molecular structure. The mechanism of crystallization in rubbers and of the transition to the glassy state at low temperatures is considered. Reference is made to recent developments of the theory of elasticity, which provide a basis for working out the stress-strain properties of rubber under various types of deformation. Experimental results on rubber in elongation, compression, and shear are presented. L. R. G. Treloar, British Rubber Producers' Research Association, London, England.

Rubber Derivatives and Plastic Films for Food Packages. Requirements for food packaging films are discussed. The chief rubber derivatives employed for food packaging are cyclized rubber (Pliolite), used to a limited extent in moisture-proof coatings and hot melt formulations, and, more particularly, rubber hydrochloride (Pliofilm) as an all-purpose, strong, flexible, heat-sealable, self-supporting foil. Other packaging films are regenerated cellulose (cellophane), vinylidene chloride copolymers (Saran), polyethylene, coated or film laminated aluminum foil, coated or film laminated glassine or paper. The essential physical data including advantages and disadvantages are tabulated for the available packaging films.

The chemistry of the rubber hydrochloride reaction is discussed, including methods for its preparation. Attempts to prepare derivatives from synthetic rubbers are described.

Attention is directed to various interesting packaging applications with Pliofilm. For example, one-way or two-way stretched Pliofilm of thickness down to 1/10 000-inch is used in packaging, particularly of fresh fruits and vegetables whose metabolism must continue during storage. A wrapping method of packaging by thermally molding Pliofilm around irregular shaped objects has been developed. Special types of Pliofilm for special applications, such as frozen food packaging, have also been developed. H. J. Osterhof, Goodyear Tire & Rubber Co., Akron, O.

Statistical Control in the Physical Testing of Rubber. The test results obtained from either repetitive tests of a single unit (if repetitive tests are possible without destruction or distortion of sample) or successive tests of samples drawn from a homogeneous master sample will, under certain delineated conditions, fall into a determinable pattern usually described by a normal distribution. The standard deviation of this distribution is, by definition, the testing error of the test and gives us a valid and useful measure of the reliability of the test. Complications of sample preparation or test procedure may necessitate special methods in determining this distribution and the testing error. Some of these are described.

Knowledge of the testing error and the pattern of variation of test results furnish a scientific basis for controlling and improving test performance in the control laboratory. This improvement and control are brought about through the use of control charts. Methods of constructing control charts for various physical tests of rubber and their use for the mentioned purpose are described. J. D. Heide, United States Rubber Co., New York, N. Y.

TUESDAY AFTERNOON—JUNE 25

High-Frequency Heating in the Rubber and Allied Industries. The object of this paper is to review some of the past developments and present practices in dielectric heating with particular reference to drying and vulcanizing processes. Some data will be presented on the characteristics of materials and the range of constants of the load circuits usually found in applications in the rubber industry.

Reference will be made to the problems of load handling and maintenance of equipment. The training of operating personnel and technicians will be discussed. Examples of production installations with benefits obtained will be given.

Brief mention will be made of the radio interference problem, and some data on field tests will be supplied. Desirable characteristics of generators and some practical limitations presently in effect will be indicated. G. P. Bosomworth, Firestone Tire & Rubber Co.

The Development of Latex Processes in Great Britain. This paper deals with developments of special technical interest and others whose historical aspect is of importance. Some of the more unusual wartime and postwar advances in latex technology in Great Britain are also described. The subject matter is treated under the three headings of processes associated with natural latex, emulsion polymers, and artificial dispersions. The interrelation of these materials is considered together with some of the particular problems associated with each. E. W. Madge, Dunlop Rubber Co., Ltd., Birmingham, England.

Integration of the Plastics and Rubber Industries. It is shown how polyvinyls and synthetic rubber have acted as catalysts in amalgamating these two industries which in 1940 were quite distinct entities. Samples and charts are used to show just how this interchangeability or interdependence of industries has come about.

After establishing the theory that the rubber and the plastics industries are so interrelated as to be no longer separate fields, the results of this joining of interests in terms of choosing the proper raw materials and engineering the end-product for specific use are discussed. The economic considerations are reviewed. R. P. Kenney, Goodrich Chemical, Cleveland, O.

Effect of Varying Monomer Ratio and Conversion on GR-S Type Rubbers. To study the effects of changing styrene content and monomer conversion on the physical properties of rubber-like butadiene-styrene copolymers, a series of samples was prepared in five-gallon laboratory reactors using butadiene-styrene charge ratios from 50/50 to 90/10 and conversions from 50 to 90%. The plasticity of all polymers was maintained approximately constant by modifier adjustment. The polymers were compounded in a standard tread formula and evaluated at equivalent states of cure.

For a given styrene content, decreasing conversion resulted in increasing rate of cure, higher tensile, elongation, and rebound and improved processibility. With increasing styrene content there was an improvement in processibility, tensile, elongation, and flex resistance at the expense of lower rebound and higher brittle point.

Suggestions are made for improving standard GR-S and for the production of new butadiene-styrene copolymers for special uses. E. D. Maher and T. L. Davies, Polymer Corp.

A business meeting of the Division of Rubber Chemistry is listed on the program for 11:20 a.m. on the morning of June 25, following Mr. Heide's paper.

Lead and Zinc Compounds Used

ALTHOUGH further improvement in sales of lead and zinc pigments was evident in 1944, the consumption of zinc oxide, lithopone, and litharge by the rubber industry declined from 1943 levels, according to the United States Bureau of Mines. Consumption of zinc oxide by the industry was 59,518 short tons in 1944, against 67,898 tons in 1943. For lithopone, 726 short tons were consumed in 1944, against 1,078 tons in 1943. Use of litharge by the rubber industry dropped from 4,302 short tons in 1943 to 3,023 in 1944. Increases in consumption of basic lead sulfate and leaded zinc oxide by the rubber industry were noted. In 1944, 268 short tons of basic lead sulfate were used, against 131 tons in 1943. For leaded zinc oxide, 119 short tons were consumed in 1944, against 42 tons in 1943. Owing to restrictions, data on titanium pigments were not published. Record-breaking production and sales of these pigments were made, which, however, fell far short of the demand.

Chemurgic Conference Papers

THE eighth annual Chemurgic Conference of Agriculture, Industry, and Science, was held in the Hotel Statler, St. Louis, Mo., March 8-20. Among the papers presented were those of M. C. Teague, of United States Rubber Co., on "Some New Contributions to Everyday Comfort";[1] Norman A. Shepard, of American Cyanamid Co., on "Industrial Research and Chemurgy"; L. F. Livingston, of E. I. du Pont de Nemours & Co., Inc., on "Research Makes Jobs"; and J. R. Turnbull, Monsanto Chemical Co., on "Plastics Developments in 1946."

Dr. Teague described experiments and developments which have resulted in new products designed to provide greater comfort in our daily activities which involve sitting, lying down, and standing. The major portion of his paper described work directed toward improving seat cushions for chairs, automobiles, planes, and buses by means of an instrument called a "pinch meter" and by the use of a specially designed pair of pants, which, used on an "expert sitter," provided information enabling the development of cushions scientifically designed to give the maximum of comfort. The pinch meter consisted of an electric light, a pressure indicator, some pressure valves, and a piece of tubing on the end of which is a small rubber balloon. In this balloon are electrical contacts which turn a light on and off. When you sit on this balloon, the electric light will become illuminated. Then if the valves are actuated to increase gradually the air pressure in the balloon, there is a point of inflation where the light goes out. At that point the pressure in the balloon is sufficient actually to raise you off the seat at that particular spot. In other words, it equals the pressure being exerted against your body at that spot. This pressure can be read on a dial, it was said. With the special pair of pants against which the pinch meter was installed in 44 places, the pressure at these 44 spots could be recorded when the subject was seated on everything from wood-bottomed chairs, modern truck seats, deluxe cushions for 1941 passenger cars, a new type of pneumatic cushion called "Crestaire," and this "Crestaire" pneumatic cushion used in conjunction with a foamed rubber pad and an elastic fabric. Dr. Teague said that he doubted if there had ever been built before an automobile cushion so comfortable as the last one described, i.e., pneumatic cushion, foamed rubber, and elastic fabric. Mattresses made of "Koylon" foam rubber will prove popular for comfort as will furniture of new designs using "Koylon" foam rubber, it was added. Further a sponge rug underlay will add comfort and luxuriousness to your home. Reference was also made to "Luvon" elastic fabric for use in automobile upholstery and in bathing suits, swim trunks, girdles, shoes, suspenders, garters, etc.

Dr. Shepard commended the National Farm Chemurgic Council for its contribution to the progress made in chemurgy during the last decade and cited developments with casein, soybeans, and the hydrogenation of cottonseed oil as evidence of industrial utilization of farm products by industry. In discussing natural *versus* synthetic rubber, it was stated that GR-S—though of amazing quality—was inferior to natural rubber in certain respects and so long as natural rubber quality remains superior to synthetic rubber, its economic position is reasonably secure. However, it was added, most rubber chemists feel and predict that the spread in quality, which already has been narrowed, will through intensive research disappear, and that in time the synthetic material may well take the lead. In this connection Dr. Shepard said he believed that chemistry will again win over nature and produce a product of superior quality and uniformity. In this and in other similar cases, the answer for the chemurgists is research and more research on the utilization of farm products. Reference was made to the excellent facilities of the four Regional Laboratories of the U. S. Department of Agriculture for such research, and it was also suggested that by setting up advisory committees, made up of men of diversified and broad training and experience in industry the work of government scientists in the chemurgic field could be aided greatly. The speaker's connection with the Rubber Survey Committee, the U. S. Navy Rubber Survey Committee, the Research Board of the Office of the Rubber Director, and the Technical Advisory Committee of the Quartermaster General, was mentioned as having been a means of seeing how useful such committees could be both in war and in peace.

Mr. Livingston in his paper explained how by research the chemical industry, which in 1919 gave employment to about 71,000 people, by 1939 had grown so that nearly 300,000 workers were engaged and that during the late war a peak employment of 750,000 workers was reached. Twenty years ago the public didn't realize that it needed cellophane or nylon or many of the other materials which have become essentials of modern life. Consequently there are thousands of people today making a living in the manufacture and sale of these articles that were not even ideas a few years ago, it was said. New developments financed by the risk of capital make new jobs. In the du Pont company nearly half the employes owe their jobs to products which either did not exist 20 years ago or were not made in commercial quantities. About one-quarter are working on products entirely new since 1930, Mr. Livingston declared. Industry's program and platform is, therefore: research and development of new and improved materials; production methods to make these materials in large quantity and at low cost; and the investment of capital to provide the means for both development and production which means more jobs.

Mr. Turnbull in talking on developments in plastics first referred to the technological progress of the past decade, which by virtue of the forced draft of military need was crammed mostly into the last four years. Both new plastics and new applications were developed, and it was pointed out that the plastics industry was entering upon a period when it could capitalize on the knowledge accumulated to use more fully the intrinsic advantages of the plastics now made. For the industry as a whole it was estimated that the output of all plastic raw materials will be increased approximately 300% during 1946. Reference was made to the predictions of

[1] Copyright 1946 by United States Rubber Co., Rockefeller Center, New York, N. Y.

Gaston F. Dubois, of the Monsanto company, that the production of plastics will probably double every five years for a period of at least ten years. Although this plastics production will become an increasingly important outlet for agricultural products, in relative tonnage, the ratio of consumption of agricultural raw materials per pound or ton of plastics output will decline because of the more rapid growth of chemically synthesized plastics, Mr. Turnbull said. This decline is due in part to one fundamental weakness of plastics from agricultural products in comparison with chemically synthesized plastics, in that the former are not quite so good and cost more to manufacture, he added. Although the various thermoplastic materials are not at present in competition with each other, because of shortage of all thermoplastics, at some time in the future a direct competition between chemically synthesized thermoplastics and cellulose base materials will develop. This problem is one for the processors of cotton and wood pulp it was said. Attention was called to the fact that the volume of use of synthetic resins in combination with other materials to produce new structures for a wide variety of applications has already outstripped the volume of use of molding materials in total tonnage. In conclusion, Mr. Turnbull stated that the plastics industry does not consider itself in competition with any other basic industry, nor does it visualize a plastic age to displace the age of steel. Plastics will have and will continue to make their greatest progress through their contribution to improvements in the beauty, utility, and value of products which in almost every case will actually be combinations of plastics with the more familiar industrial raw materials, he explained.

SAE Summer Meeting

THE Society of Automotive Engineers held its summer meeting on June 2 to 7, at French Lick Springs Hotel, French Lick, Ind. The tentative program, in addition to a banquet and business session, included 23 papers covering the fields of transportation and maintenance, passenger cars, trucks and buses, materials, aircraft power plants, air transport, automobile bodies, diesel engines, and fuels and lubricants. Of particular interest to the rubber industry were the papers on "An Independent Four-Wheel Suspension with Rubber Torsion Springs," by A. S. Krotz, R. C. Austin, and L. C. Lindblom, of The B. F. Goodrich Co., and "Classification of Rubber and Rubber Compounds," by G. H. Swart, director of research for General Tire & Rubber Co.

The paper on rubber torsion springs was exemplified by the exhibition of a small, light five-passenger car equipped with the springs, independent wheel suspension, and hydraulic steering. The "Torsilastic" springs were said to consist of rubber cylinders bonded internally to central shafts and externally to outer shells, either of which is held stationary and the other rotated by a wheel support arm. Front suspension of the car was stated to consist of single-wheel support arms mounted diagonally from the dash on the outer member of the cylindrical rubber torsion springs. Steering was accomplished by two balanced hydraulic circuits kept under minimum positive pressure by a spring-loaded reservoir.

In his paper Mr. Swart commended the work of committees representing SAE and A.S.T.M. in classifying natural and synthetic rubber compounds according to fundamental physical properties. He recommended that knowledge of the dynamic as well as the static properties of rubbers be developed and predicted that rubber and rubbery materials would find wider usage as interest is given more to their physical properties than to composition, and better specifications are prepared. The new synthetic materials now available, and the better understanding of natural rubber itself, allow a much broader basis than ever before for improved quality. It is also being recognized, said Mr. Swart, that specifications should include only the pertinent requirements and should in no way limit the ingenuity of the rubber technologist in providing suitable materials at lower cost.

Tire Design Discussed

THE Northern California Rubber Group held a dinner-meeting on April 25 at the Claremont Hotel, Berkeley, Calif., with a total attendance of 75, including 15 guests. Speakers of the evening were Charles J. Roese, of the Goodyear Tire & Rubber Co. of Calif., and Erven White, of the Fiberglas Corp.

"Elements of Tire Design" was the title of Mr. Roese's address, in which he discussed the development of tire design and the components of modern tires, after giving a brief history of rubber and compounding as background material. He stated that he believed that rayon would soon be the universal material for tire fabric; the main objection to nylon at present is its prohibitive cost. Nylon also develops flat spots on large tires if they are allowed to sit for long periods of time, but this condition is temporary and the tires will smooth out after they have been run for a short time. The use of wire fabric in tires makes them difficult to repair and also necessitates operation of the tires at high pressures, which is contrary to present trends in tire design. In reply to a question as to whether the industry would return to natural rubber tires as soon as possible, Mr. Roese stated he believed that it would be at least three years before sufficient natural rubber would be available for all our tire needs. He did not believe, however, that manufacturers would ever go back to natural rubber for passenger-car tires as synthetic rubber had been found equally satisfactory for this purpose provided the tires were kept properly inflated, and this problem could be solved by use of GR-I tubes. The situation for truck tires was somewhat different as synthetic tires have not been found entirely satisfactory owing to greater heat build-up. As natural rubber becomes available, it will go into the manufacture of truck tires, first into the breaker casing, next into the cement between plies, and finally into the tread, until the tires are natural rubber throughout.

Speaking on "Fiberglas," Mr. White covered the properties of the various Fiberglas products, ranging from the simple air filters to decorative fabrics and impregnated plastics; the talk was amply illustrated by many samples. Noncombustibility, high tensile strength, and resistance to oils and corrosive vapors give Fiberglas fabrics many special uses in industry. Incombustibility and dimensional stability are rare properties in textiles, said Mr. White, and possession of these qualities is largely responsible for the numerous current uses of Fiberglas textiles and the interest shown by the textile industry in exploring possible additional uses both of the glass fibers alone and in combination with other fibers. Development work on the use of Fiberglass as a reenforcing material is being carried on in rubber products, mainly in mechanical goods and allied products. Because of its high strength, light weight, and heat resistance, it finds many applications, typical of which is its use in high-pressure spray hose, steam hose, and other hose. In conveyer belting, development work indicates good success with combination Fiberglas-cotton fabrics which process well and handle without difficulty in building operations. Applications in conveying hot materials, such as sand in foundries, have indicated good performance.

S. G. Byam, of E. I. du Pont de Nemours & Co., Inc., also spoke, giving a brief discussion of the current activities of the Division of Rubber Chemistry of the American Chemical Society and of the Division's technical publication, "Rubber Chemistry and Technology."

A thermos ice tub, donated as a prize by Mr. Byam, was won by G. B. Farwell, of Reliance Rubber Co.

The next meeting of the Group was scheduled for May 28, with the principal speaker C. A. Carlton, of J. M. Huber, Inc., discussing "Pigments."

Russell Receives A.I.C. Medal

ROBERT P. RUSSELL, president of Standard Oil Development Co., was awarded the gold medal of the American Institute of Chemists at a banquet during the Institute's twenty-third annual meeting, May 17 and 18, at the Hotel Biltmore, New York, N. Y. The medal was presented by Gustav Egloff, president of the Institute, before an assemblage of more than 400 members and guests.

In his acceptance address Mr. Russell stressed the need of maintaining the high standard of technical achievement set during the war. He praised the granting to the government of royalty-free licenses to use for defense purposes any inventions made in the course of government-financed work. In peacetime, however, such a system would not be conducive to further development and research work as it would practically prohibit groups from undertaking work for the government in fields of their own commercial interest. For atomic energy research and development, Mr. Russell stated his belief in the need of government control of source materials and the production of fissionable material under strict government license. At the level of commercial adaption, our patent system could be relied upon to safegrard the national interest while still promoting progress. A formula can and will be found, said Mr. Russell, which will safeguard the public interest while at the same time grant the necessary freedom and incentive to our industrial research and development agencies.

War Problem Successfully Met

THE spring meeting of Detroit Rubber & Plastics Group, Inc., was held May 17 at the Detroit-Leland Hotel, Detroit, Mich., with 100 members and guests attending. Speaker of the evening was C. L. Wanamaker, production manager of the tire division of United States Rubber Co., whose topic was "Wartime Challenge to Management." The latter part of the program consisted of a showing of an Army Ordnance motion picture, "Flotation Studies of Army Vehicles in Muddy Terrain."

Mr. Wanamaker spoke of the serious shortage of small arms that existed in England after the battle of Dunkirk. This situation was not relieved until the Summer of 1942 when the United States swung into mass production of small arms. Along with many other American manufacturers, U. S. Rubber accepted the challenge of producing materials foreign to their normal manufacture. Facilities and factories were organized for the development, improvement, and manufacture of machine guns, light caliber guns, and particularly the .50 caliber used against German planes. Early in 1940, Army Ordnance and the ordnance industry organized a team for building and guiding the manufacture of gunpowder and small arms ammunition, and the facilities of Remington Arms Co., Western Cartridge Co. and Federal Cartridge Co. were rapidly expanded to meet increased needs. In 1940, German self-sealing gas tanks having crude rubber as the sealant, oil-resistant synthetic liner, and an expansive rawhide covering were sent to Ottawa, Canada, and then to U. S. Rubber for examination and study. The problem was to find a bullet capable of exploding these tanks, and .50 caliber incendiary bullets proved very successful. One of the greatest challenges to management was the mass production of cartridges, and this was met by new construction, new and improved equipment, and the training of unskilled personnel. The art of cartridge making became a science, with scrap in the production of .50 caliber bullets reduced from 15% to less than 1% rejects. During the war period the United States produced 2½ times as much goods as in any other period by means of united incentive. The problem now, said Mr. Wanamaker, is to translate this wartime cooperation to peacetime effort and production. The problem of mastering materials and production was solved, but the problem of dealing with people still exists and remains a challenge to peacetime America.

Summer Laboratory Clinics

THE Polytechnic Institute of Brooklyn, 99 Livingston St., Brooklyn 2, N. Y., has announced a series of five laboratory clinics which will be held this summer. There will be two sessions on "Weight and Shape of Polymer Molecules in Solution," one from June 24 to 28, and the second from July 15 to 19. The other sessions will be "Industrial Applications of X-Ray Diffraction," from August 12 to 23; "Advanced X-Ray Diffraction Course," from August 26 to 31; and "The Preparation of High Polymers in Bulk, Solution, Suspension and Emulsion," from September 2 to 6.

CALENDAR

June 2-7. SAE. Summer Meeting. French Lick Springs Hotel, French Lick, Ind.

June 7. Philadelphia Rubber Group. Kugler's Restaurant, Philadelphia, Pa.

June 11. Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.

June 17-20. American Society of Mechanical Engineers. Semi-Annual Meeting. Detroit, Mich.

June 21. New York Rubber Group Outing. Blasberg's Cove, Hawthorne, N. J.

June 21. Rhode Island Rubber Club. Outing. Wannamoisett Country Club.

June 21. Akron Rubber Group. Outing. Seiberling Country Club.

June 24-26. Chemical Institute of Canada. Annual Conference. Royal York Hotel, Toronto, Ont., Canada.

June 24-28. American Society for Testing Materials. Annual Meeting and Seventh Exhibit of Testing Apparatus and Related Equipment. Hotel Statler, Buffalo, N. Y.

June 28. Boston Rubber Group. Outing.

Sept. 9-13. American Chemical Society, Chicago, Ill.

Sept. 14-17. National Association of Waste Material Dealers, Inc. Fall Convention. Palace Hotel, San Francisco, Calif.

Oct. 7-11. National Safety Congress and Exposition. Chicago, Ill.

Oct. 18. Detroit Rubber & Plastics Group, Inc. Detroit Leland Hotel, Detroit, Mich.

Fisher at A. C. S. Sections

HARRY L. FISHER, director of organic research, U. S. Industrial Chemicals, Inc., spoke on "The Chemistry of Natural and Synthetic Rubbers" before three Midwest local sections of the American Chemical Society during March. Dr. Fisher appeared before the Lake Superior Section, Duluth, Minn., on March 16; the Minnesota Section, Minneapolis, Minn., on March 19; and the Northeast Wisconsin Section, Appleton, Wis., March 20.

In addition to the talk on rubber Dr. Fisher also discussed "The Human Side of Research and Invention" before the Lake Superior Section on March 16. In this talk he explained that there is a type of research problem concerning which so much data can be obtained that only one conclusion is possible, but there is another type with such infinite possibilities that assembling adequate data is out of the question. Then a "flash of genius" or a "leap of the imagination" is required, and it is here that chance often takes a hand. How chance can help to bring about a major scientific advance was illustrated by Charles Goodyear's discovery of the vulcanization process, Dr. Fisher said.

L. A. Group Arrangements

PLANS for a big meeting of the Los Angeles Rubber Group have been completed for June 11 at the Mayfair Hotel, Los Angeles, Calif., with the United States Rubber Co. as host and William Jeffers, former Rubber Director and president of the Union Pacific Railroad, as guest speaker.

Decision to hold the meeting June 11, instead of June 4, was made to avoid conflict with the June 4 elections. Arrangements for the U. S. Rubber participation in the program are being made by Curtis Wolter, of the Synthetic Division of the company, who is associate chairman of the Los Angeles Rubber Group.

The May 7 meeting of the Group brought out 103 guests and members to the Mayfair Hotel to hear Harvey Stowers, assistant to the president of Aircraft Industries Association of America, discuss the age of air transportation. Elbert Davis, chief chemist and technical director of the New Plastic Corp., addressed the technical meeting on the subject of chemistry and application of silicone plastics and silicone rubber. Mr. Davis discussed the high-temperature resistance, chemical inertness, water resistance, good dielectric properties, oxidation resistance, and low-temperature flexibility of the material in industrial applications.

Elliott McLaughlin, of H. M. Royal, Inc., was in charge of the technical meeting.

New Insulating Board

FOSTER D. SNELL, INC., Brooklyn, N. Y., has developed Foamboard, a new type of insulating board which uses glue as its principal raw material. The new product weighs 1-3 pounds per cubic foot and ranks high among commercial heat insulations. The board has fair strength, although not enough to be used unsupported in structures. In thin layers the new product somewhat resembles flannel, but as usually made it has the appearance of dried natural sponge cut into approximately square foot slabs, one inch thick. By the use of different fillers, the characteristics of the product can be varied between wide limits, and the curing process imparts to the glue high resistance to water, fungi, and other destructive agents. In the making of the product, the raw materials are mechanically foamed in aqueous solution and then dried to become water-insoluble and non-flammable. The weight can be reduced below one pound per cubic foot, but is usually above this value. By changes in method of manufacture, the size of the air cells in the material can be varied over a substantial range. The foam may have compounded with it synthetic rubber, asphalt, wood fibers, glass fibers, and many other materials to give special properties. The material is odorless, can be cut with a knife, sawed, and otherwise shaped. In one-inch thickness, the material is flexible and elastic. Foamboard will absorb liquids because the air cells are largely interconnected. The product is suggested for insulating vehicles, railroad cars, trucks and airplanes, wherever extreme lightness is required together with efficient insulation against heat, cold, or noise.

Additional Experimental GR-S and GR-S Latices

ADDITIONS to the list of experimental GR-S dry polymers and GR-S latices available for distribution of rubber goods manufacturers from the Office of Rubber Reserve, RFC, under the conditions outlined in our November, 1945, issue, page 237, have been received and are listed below:

X-Number Designation	Manufacturing Plant	Date of Authorization	Polymer Description	Special Characteristics
X-304-GR-S	National Synthetic, Louisville	4/24/46	High styrene content GR-S emulsified with Daxad and rosin acid soap, carried to a high conversion, short-stopped with hydroquinone, and stabilized with 1.5 parts Stalite.	To be used in tape manufacture.
X-308-GR-S Latex	U. S. Rubber, Naugatuck	5/13/46	GR-S Type II latex emulsified with Daxad; 40-50 Mooney; 55-60% solids.	General-purpose latex.
X-309-GR-S Latex	Goodrich-Louisville	5/15/46	Type II latex with formulation especially developed for better tire cord adhesion.	
X-310-GR-S Latex	U. S. Rubber, Naugatuck	5/15/46	High styrene content GR-S latex emulsified with Daxad carried to a high conversion, 55-60% solids.	General-purpose use.

Reauthorizations have been issued for the following polymers which were previously authorized, made, and in consumers' tests found advantageous:

X-Number Designation	Manufacturing Plant	Date of Authorization	Polymer Description	Special Characteristics
X-181-GR-S	U. S. Rubber, Institute	4/26/46	Regular GR-S-85 produced at lower than normal conversion.	This material should have a lower quantity of looser gel than std. GR-S 85 and thus may be more susceptible to solvent swelling and processing. Its Mooney plasticity, however, is similar to GR-S 85.
X-245-GR-S	U. S. Rubber, Institute	4/26/46	GR-S with a high styrene content, 1.5 non-staining antioxidant, 0.15 sodium sulfide, alum coagulated.	This polymer should have superior physical properties in non-black stocks, but poor freeze resistance.
X-272-GR-S	U. S. Rubber, Institute	4/26/46	Rosin soap GR-S made to high conversion, and stabilized with one part Stalite; 95-105 Mooney; acid coagulated.	This rubber has good adhesiveness and cohesiveness imparted to it by its high Mooney viscosity and the use of rosin soap, thereby making it useful in adhesives and footwear stocks.
X-285-GR-S	U. S. Rubber, Naugatuck	5/3/46	Butadiene/styrene polymer with an auxiliary chemical to produce high gel content in the polymer, shortstopped with hydroquinone, and stabilized with 1.5 BLE; salt acid flocculated; 60 Mooney viscosity.	This material should show superior processing and very low shrinkage characteristics. For use in footwear stocks, wire insulation, extruded mechanical goods, and other type of products where these characteristics are desired.
X-292-GR-S	U. S. Rubber, Institute	4/26/46	Masterbatch containing 100 parts Buca A clay and 100 parts of a GR-S-type polymer made with sodium sulfide shortstopper; 40 Mooney viscosity; 1.5 parts EFED.	Clay masterbatches are reported to have superior processing and handling characteristics. For use in stocks requiring this type of material.

A.S.M.E. Rubber & Plastics Plans

AS A part of the semi-annual meeting of the American Society of Mechanical Engineers, scheduled for Detroit, Mich., June 17 through 20, the Rubber and Plastics Division will have a program of two half-day technical sessions. The first session will take place in the Book-Cadillac Hotel on the afternoon of June 19, and the second session will be held at the same place the morning of June 20. The program is in charge of James H. Booth, of Thompsons Products, Inc., chairman of the Division.

The session on June 19, which will be devoted to rubber, will hear two papers: one on "Rubber Spring-Shear Loading—Part II," by J. F. Downie Smith, of United Shoe Machinery Corp.; and the other on "Evaluation of Rubber and Like Materials" by J. D. Morron, United States Rubber Co. The chairman for this session will be S. D. Gehman, of Goodyear Tire & Rubber Co., while the recorder will be Phillip H. Smith of Firestone Tire & Rubber Co.

The plastics session on June 20 will have three papers presented. The first, "Plastics Mold Release," will be given by Earl E. Ziegler, of Dow Chemical Co., the second, "Flexible Organic Adhesives as Structural Elements," by D. L. Loughborough and F. D. Snyder, of The B. F. Goodrich Co.; and the third, "Engineering Properties of Fabric Base Thermosetting Laminates," by R. K. Witt of John Hopkins University. Frank Warner, of General Electric Co., will act as chairman for this session, and W. J. McCortney, of Chrysler Corp., will act as recorder.

Akron Group Meeting

THE Akron Rubber Group held a meeting on May 17 at the Mayflower Hotel, Akron, O. A total of 225 members and guests who attended the dinner-meeting heard Arthur C. Horrocks, of the Goodyear Tire & Rubber Co., speak on "To the Right and Straight Ahead." Mr. Horrock's talk was of a general nature on the industrial possibilities of the United States. Emphasizing the possession of all necessary materials, labor, and knowledge, the speaker called for increased activity and production in all fields.

Results of election for officers of the Group were announced by the tellers' committee. Jack R. Moore, of Standard Chemical Co., was elected chairman, and Roy M. Vance, of General Tire & Rubber Co., was elected vice chairman. For the office of secretary-treasurer, an exact tie was reported between Henry F. Palmer, of Firestone Tire & Rubber Co., and Jack H. Fielding, of Goodyear Tire & Rubber Co. The tie vote, the first in the Group's history, will be broken by a special election at the next meeting on June 21.

This meeting will be the summer outing, to be held at the Sciberling Country Club. Golf will be the feature of the affair, and prizes contributed by suppliers will be raffled off after dinner.

Chicago Group Meeting

THE Chicago Rubber Group held a meeting on May 24 at the Morrison Hotel, Chicago, Ill., The program consisted of three guest speakers. James A. Merrill, assistant research manager of Goodyear Tire & Rubber Co., spoke on adhesives and, in particular, adhesives to metal applications. John M. Ball, eastern representative of the Midwest Rubber Reclaiming Co., gave an informative and practical talk on "Reclaimed Rubber during Reconversion." A description and exhibit of some of the more recent work with ultra-microscopic examination of various types of rubber and synthetic rubber emulsions was given by Ernst A. Hauser, of M.I.T.

The Group also held elections of officers for the forthcoming season. Those elected were: chairman, Francis S. Frost, Jr., of Frost Rubber Co.; vice chairman, Wm. N. Crumpler, of Geo. S. Mepham Corp.; secretary-treasurer, Robert C. Dale, of Inland Rubber Co. In addition to the newly elected officers, other members of the executive committee are: J. T. Adams, R. H. Barbour, Elmer E. Frost, R. H. Girster, Harold Stark, C. E. Wonder, C. M. Baldwin, S. A. Davis, W. H. Lussie, J. R. Morath, D. M. Pratt, and S. L. Weller.

Plastics Technology

Plastics as Materials of Construction[1]

Lorin B. Sebrell[2]

TO COVER the entire field of plastics is too great a task for one evening. Even to discuss the various types of plastics which may be used as materials of construction is also more than can be covered within the scope of the present talk. However certain classes will be selected as representative of the uses to which plastics may be applied, and the properties which may be obtained in these various applications will be pointed out.

Classifications of Plastics

It may first be well to look at a chart showing the classifications of plastics generally. It is well known that they may be divided into two general classes: the thermoplastic and the thermosetting resins. Thermoplastic materials may, of course, be re-formed by the application of heat; whereas the thermosetting resins, after having once been formed by heating, may not again, as a rule, be softened and transformed into other shapes.

TABLE 1. PLASTIC CLASSIFICATION

THERMOPLASTIC

1. Cellulose derivatives
   a. Cellulose nitrate
   b. Cellulose acetate
   c. Ethyl cellulose
2. Vinyl derivatives
   a. Polyvinyl chloride
   b. Polyvinyl chloride-acetate
   c. Polyvinyl-vinylidene chloride
   d. Polyvinyl acetals
   e. Polyvinylidene chloride
3. Acrylic resins
   a. Polymethylmethacrylate
4. Polystyrene
5. Polyethylene
6. Nylon

THERMOSETTING

1. Phenol-formaldehyde
2. Phenol-furfural
3. Urea-formaldehyde
4. Melamine-formaldehyde
5. Allyl resins

The main types of resins under each classification are shown in Table 1. It will be apparent that the cellulose derivatives, the phenolic and urea-melamine types of resins, as well as several of the others given in this table, may be considered as materials of construction. However it is my purpose to select certain resins from this table and to confine my remarks to these particular products, making it clear in the meantime that those which I have selected are not necessarily all of the types of plastics which may be considered under this general heading. I think that the general properties of the various resins shown in Table 1 need no detailed comment inasmuch as their specific properties are well known to most of you. However, in this connection, it is interesting to note a few of the properties which may be obtained with various of these plastics; these are listed in Table 2. It is believed that this table will require no further comment because the properties of each of these materials speak more or less for themselves. The chemical resistance of the various plastics is shown in Tables 3 and 4. In many cases the resistance of plastics to certain chemical reagents is much greater than that of some of the more commonly used metals.

[1] Presented before the New York Section, American Institute of Chemists, New York, N. Y., March 22, 1946.

[2] Director of research, Goodyear Tire & Rubber Co., Akron, Ohio.

TABLE 2. PROPERTIES OF MOLDED PLASTICS

Resin	Tensile Strength P.S.I.	Flexural Strength P.S.I.	Modulus of Elasticity P.S.I.	Impact Strength Ft. Lbs./In. Notch	Heat Distortion Point ° F.
Cellulose acetate	6,000	10,000	200,000	1.0-2.0	160
Phenol-formaldehyde (cellulose filled)	7,500	10,000	1,000,000	0.2-0.3	300
Urea-formaldehyde (cellulose filled)	7,000	10,000	1,300,000	0.3-0.4	Decomp.
Polystyrene	6,500	9,000	450,000	0.3-0.4	170
Nylon	9,000	13,500	200,000	3.0-4.0	150

TABLE 3. CHEMICAL STABILITY—% ABSORPTION IN 24 HOURS' IMMERSION

	Cast Allyl-Type Resin	Aluminum 3S—½H	Steel SAE 1010
Ethyl alcohol	0.3	Resistant if pure solvent	Resistant if pure solvent
Acetone	1.4	Resistant if pure solvent	Resistant if pure solvent
Ethyl acetate	0.7	Resistant if pure solvent	Resistant if pure solvent
Carbon tetrachloride	0.0	Resistant if pure solvent	Resistant if pure solvent
Chloroform	1.6	Resistant if pure solvent	Resistant if pure solvent
Acetic acid (5%)	0.8	Slowly attacked	Slowly attacked
Gasoline	0.02	Resistant if pure solvent	Resistant if pure solvent
Benzene	0.2	Resistant if pure solvent	Resistant if pure solvent
Toluene	0.2	Resistant if pure solvent	Resistant if pure solvent

TABLE 4. CHEMICAL STABILITY—% ABSORPTION IN 24 HOURS' IMMERSION

	Cast Allyl-Type Resin	Aluminum 3S—½H	Steel SAE 1010
H_2O	0.8	0.00	Slowly attacked
H_2SO_4 (30%)	0.8	Attacked	Attacked
H_2SO_4 (3%)	0.7	Attacked	Attacked
HNO_3 (10%)	0.7	Slowly attacked	Attacked
HCL (10%)	0.6	Attacked	Attacked
NH_4OH (10%)	1.1	Slowly attacked	0.00
NaOH (10%)	0.1	Attacked	0.00
Na_2Co_3 (2%)	0.8	Attacked	0.00
NaCl (1%)	0.65	Slowly attacked	Slowly attacked

Production

In Table 5 we have assembled some information on the production of resins through 1944 showing the increase in the manufacture of this type of material. There is no doubt but that each of these classifications will, in 1946, show a substantial increase over the 1944 production.

TABLE 5. PRODUCTION OF PLASTICS

Material	Millions of Pounds* 1940	1943	1944
Cellulose compounds			
Nitrate	12	20	20
Acetate	24	55	55
Others	8	32	34
Thermoplastics			
Polystyrene	2	4	4
Methacrylate	3	37	50
Polyvinyl	18	83	120
Coal-tar resins	26	55	55
Alkyds	100	100	100
Thermosetting resins			
Phenolics	93	152	176
Urea	22	65	75
Total	308	603	689
Styrene Monomer	15	350	405

* These are approximate figures.

Scope of the Present Paper

It is my purpose this evening to confine my remarks to two or three types of plastics and to applications of certain types of procedures used in fabricating plastics, as follows:

Vinyl Plastics
  Vinyl coatings
  Extruded vinyl products
  Molded vinyl products
Processes for Plastics Applications
  Post-forming
  Laminating
  Sandwich-type constructions
Clear Glasses
Synthetic Resins from Rubber

Vinyl Plastics

As is well known, there are many varieties of vinyl plastics presently on the market, among which may be mentioned the various grades of Vinylite manufactured by the Carbide & Carbon Chemicals Corp., several types of Geon produced by The B. F. Goodrich Co.; Saran, as produced by the Dow Chemical Co. and fabricated by the Firestone Tire & Rubber Co.; and others.

Coatings

Certain types of vinyl plastics are particularly well adapted for the coating of fabrics. These may be used for decorative purposes, as in wall coverings, as substitutes for leather in upholstery, or compounded with various materials to make paint or lacquer type coatings for application to a number of different articles. The application of the vinyl materials in the form of thin self-supporting films is also an important use for this type of material. It would be hard indeed to select from this list one application which might be considered more important than another. These resins are excellent in all of the uses mentioned and are, in fact, displacing some of the older types of resins which have been used for these purposes. The application of vinyl resins to the manufacture of floor coverings also has received considerable attention. They have some advantages over rubber flooring which recommend them: for example, their resistance to sunlight and to grease and

oil, as well as their resistance to oxidation. These same properties have recommended this series of materials as replacements for rubber in several cases where rubber has previously been used.

Extruded Vinyl Products

Under the category of extruded vinyl products may be mentioned such things as various types of gaskets for refrigerators, fender welting, and also for various purposes. The advantages listed as being favorable for the application of vinyl resins to coating materials apply in great measure to the products made by extrusion. The processing of Saran into thread, and the weaving of the thread into screening and upholstered materials, also is very well known. Saran has also been used extruded in the form of thin transparent sheeting which has a fairly low moisture-vapor transfer. In this connection I cannot refrain from mentioning a product of our own company, Pliofilm, which is made from rubber hydrochloride and which has been found to be particularly adaptable so far as its ability to prevent moisture transfer is concerned. Its application to packaging is continually expanding, and the results which have been obtained to date have warranted considerable optimism on the part of our own company concerning the future of this material. To go back to Saran, it also has been extruded in the form of pipe for the transfer of corrosive chemicals.

Molded Vinyl Plastics

Vinyl objects molded in automatic molding equipment will in some instances perhaps entirely replace the same articles made by conventional methods from rubber, this because of the fact that their manufacture is less costly when automatic machinery is used and also because of the fact that in many cases the products made from vinyl compounds are not attacked by oxygen, oil, or ozone, as are corresponding rubber articles. A typical example is the distributer nipple made from a vinyl compound as compared with one made from rubber.

Processes for Plastics Applications

Post-Forming

The next general subject of the application of plastics as a material of construction lies in the art known as post-forming. In this process a sheet of fabric, generally impregnated with phenolic resin, is only partially cured. It may then be placed in an oven and softened and bent over molds by the application of pressure, being shaped into any form desired, after which it hardens into the new shape. This method, developed by William Beach, of the North American Aircraft Co., during the war, found very considerable application in the manufacture of plane parts during the war years. It is still being used for certain peacetime applications, and it will undoubtedly be further extended owing to the cheapness with which it can be operated.

Laminating

This process—in which layers of cotton, glass, or other types of fabrics are saturated with the resin, laid over a form, and then, by the application of a rubber bag and pressure or vacuum, formed into the desired shape—has been very intriguing to the designers of many different types of objects. The general properties to be obtained from such laminated plastics, in comparison with aluminum and steel, are shown in Table 6. It will be seen that a glass-plastic lamination compares very favorably with aluminum sheet and not too unfavorably with steel itself. In fact, there are many people who will claim that laminated glass fabric may be so made that it will equal steel on a unit weight basis. Many different types of materials have been advocated for this purpose, and some typical results using the various resins are shown in Table 7. There are, however, two fairly sizable difficulties in the general application of this method. One of these is the fact that it is necessary to use a rubber bag to which vacuum or pressure is applied. It is also necessary to use a parting medium between the rubber bag and the laminating plastic so that the bag may be readily removed from the work. In the first place, unless the bag is protected from the fumes of the resin, or unless the resin itself has low volatility, serious decomposition of the rubber bag ensues, with the resultant shortening of its life. Secondly, there is no outstandingly good parting medium which may be used between the molding material and the rubber bag. Many materials have been suggested and are now being used, but there are many drawbacks to the use of such materials as have found acceptance up to this date. If these two difficulties could be overcome (that is, if we could obtain longer bag life and better parting material), this method of utilizing laminated plastic constructions would undoubtedly find much greater application.

Table 6. Average Physical Properties of Laminated Plastics, Aluminum, and Steel

	Laminated Plastic		Aluminum	Steel
	Cotton Fill	Glass Fill	3S—½H	SAE 1010
Specific gravity	1.3	1.7	2.7	7.8
% resin	60	50		
Tensile strength, p.s.i.	7,500	47,000	21,000	65,000
Mod. of elasticity, p.s.i.	550,000	2,240,000	10,300,000	30,000,000
Compressive strength, p.s.i.	25,000	40,540	21,000	80,000
Impact strength, ft. lbs./in. notch	4.3	29.0	36.0	57.0
Burning rate in./min.	.7	.2		
Shear, p.s.i.		13,000	14,000	33,000

Table 7. Properties of Low Pressure Laminating Resins

Resin	Specific Gravity	Tensile Strength P.S.I.	Flexural Strength P.S.I.	Mod. of Elasticity P.S.I.	Bond Shear P.S.I.
Plaskon 900	1.69	30,800	39,050	1,360,000	716
Laminac 4122	1.70	39,000	31,600	1,370,000	730
CR-39	1.70	38,360	41,150	1,760,000	785
Styrene	1.58	38,025	37,000	2,940,000	425
GRM-1	1.60	38,920	49,950	1,827,000	725
GRM-2	1.70	38,000	38,000	1,457,000	750
Monsanto X525	1.57	37,200	31,800	1,250,000	855

Laminate construction—12 plies OC-64 glass fabric—heat treated.

Table 8. Properties of Cellular Materials for Sandwich Construction

Material	Density Lbs./Ft.³	Compressive Strength P.S.I.	Compressive Modulus P.S.I.	Tensile Strength P.S.I.
Blown GR-A hard rubber	6.8	120	5,680	69
Blown GR-A hard rubber	13.1	170	5,680	157
Blown GR-S hard rubber*	9.0	200	..	110
Foamed GR-S latex hard rubber	9.0	45	1,830	7
Cellulose acetate	9.7	170	4,410	108
Polystyrene*	5-7	110-200	8,000	200-350
Phenol-formaldehyde*	7-10	100	2,500	80
Polyvinyl formal*	10-20	170	..	340
Urea formaldehyde	8.8	120	5,590	43
End grain balsa	8.4	1090	78,150	140

* These values from the literature; all others our tests.

Table 9. Sandwich Column Properties

Core Material	Column Weight Lbs./sq. ft.	Buckling Load Lbs.	% Yield of Face Realized	Weight Efficiency
Blown GR-A hard rubber	1.51	6,250	28.1	69.2
Blown GR-A hard rubber	1.80	13,150	63.4	1268
Foamed GR-S latex hard rubber	1.71	4,050	19.1	402
Cellulose acetate	1.64	11,725	54.7	1262
Urea formaldehyde foam	1.61	2,390	11.1	250
End grain balsa	1.69	22,000	100.0	2350

Sandwich-Type Constructions

In this process a core material made from various types of plastics is incorporated between two thin sheets of metal (which may be aluminum or thin steel) or between two sheets of hard laminated plastic. Such a construction gives very light weight and exceptional strength. Several airplanes have already been constructed using such types of material, and both the Army and the Navy are very much interested in it, particularly in a product called Metalite, in which thin layers of aluminum are used for the outside layers and a layer of balsa wood is the inner layer. The general properties of this type of construction, using various-type filler materials and aluminum sheet as the outer layers, are given in Tables 8 and 9. Table 8 shows the data on density, compressive strength, and tensile strength of several filler materials. It will be noticed that end-grain balsa is still outstanding. The same superior results for the balsa sandwich are obtained when it is tested in the form of a column. This material will undoubtedly play a much greater part in various types of construction if a superior core material can be developed. There is undoubtdely a great deal of work being done in the various laboratories directed toward overcoming the handicap of this limitation in material for core construction, and probably some superior materials will be forthcoming in the near future.

TABLE 10. PROPERTIES OF CLEAR CASTING RESINS

Number / PHYSICAL PROPERTIES	B69	B81	CR39	Plexiglas	Plate Glass
Monomer Specific Gravity	1.075	1.117	1.133	0.945	...
Polymer Specific Gravity	1.25	1.31	1.32	1.19	2.50
Specific Gravity Change during Cure (%)	16.3	16.5	16.5	25.9	...
Per Cent Catalyst	3.0	2.5	3.0	2-5	...
Rockwell "M" Hardness	95-100	95-100	88-93	85-90	...
Tensile Strength, p.s.i.	5500	3500	5000-6000	7500	6500
Modulus of Rupture, p.s.i.	7700	10,000	8000-10,000	14,000	6500
Modulus of Elasticity, p.s.i.	250,000	240,000	270,000	400,000	1,000,000
Abrasion Resistance Relative to Plate Glass	3.5	6.5	1.1	12.1	1.0
OPTICAL PROPERTIES					
Light Transmission %					
Before Aging					
White Light	92.3	89.4	92.0	92.0	...
500 mμ	91.0	89.0	91.5	92.0	...
After Aging 100 Hrs. (Fadeometer)					
White Light	91.7	88.0	90.2	92.0	...
500 mμ	87.0	82.0	87.0	92.0	...
After Aging 200 Hrs. (Fadeometer)					
White Light	90.7	86.5	89.3	92.0	...
500 mμ	84.0	78.5	85.0	92.0	...
Haze %					
Before Aging	2.02	2.23	2.04	1.5-2.0	...
After Aging 200 Hrs.	2.94	2.81	2.38	1.5-2.0	...

Clear Glasses

The development of a clear glass-type of plastic which will be harder than Lucite and Plexiglas, which are acrylate derivatives and which were widely used during the war, would be most desirable. The manufacturers of Lucite and Plexiglas have expended considerable effort to improve the hardness and scratch resistance of their materials, without too much success. However the first improved material of this type was an allyl resin produced by the Pittsburgh Plate Glass Co.; it is known as CR-39. This product has properties resembling, in general, those of the materials commonly used, but it, furthermore, has the advantage of much greater resistance to scratching.

Table 10 shows a comparison of glass-like resins. One disadvantage of these materials, however, is that they are generally more brittle than Lucite and Plexiglas, which factor also limits their use. Considerable work is now being directed toward overcoming this objectionable brittleness. If a satisfactory resin can be made which will be as hard as these resins and have improved flexibility, it will undoubtedly be used fairly extensively.

Synthetic Resins from Rubber Materials

During the years preceding the war the Goodyear company made from natural rubber a resin known as Pliolite, which received considerable acceptance as a paint vehicle and as a moisture-vapor-resistant coating for paper. With the advent of the war and the curtailed use of natural rubber, the continuance of manufacture of such a resin was impossible. By suitable modifications of the synthetic rubber process, special resins, having properties similar to those of natural rubber Pliolite, have been produced.

These are known as Pliolites S-3 and S-5. Although they bear the same name as natural rubber Pliolite, their origin is entirely synthetic. These materials have been found very valuable as stiffening agents for rubber. They have also been found to be equally as satisfactory as natural rubber Pliolite for the manufacture of cement paints, coatings for corrosion resistance, interior finishes, etc. At present they are not being used to make exterior architectural paints. The use of such type of resin in insulating wire has been foand to be of service.

Saran F-122 Latex[1]

A New Coating Material

TWO new coating materials of the Saran family were introduced by the Dow Chemical Co. at the Packaging Exposition in Atlantic City, N. J., April 2-5. One, designated as Saran F-120, is a solvent-soluble resin, and the other, Saran F-122, is a latex. These coatings exhibit unusual properties in their respective uses as coatings for paper, fibers, textiles, metals, leather, films, and foils. Aside from the coating field they are applicable as bases for various adhesives and cements. The Saran resins are prominent in the field of thermoplastics for their high degree of resistance to a wide variety of chemicals and their very low rates of transmission of gases and vapors, their excellent mechanical properties and fireproofness.

The solvent-soluble Saran resins are finding their place in the general coating fields where the above combination of properties is required and where volatile, inflammable solvents can be employed.

Saran F-122 latex and its uses, with which this article is chiefly concerned, furnish an additional means of making use of the inherent qualities of the Saran resins: namely, through their use as film-forming coating compositions in which water is the only dispersing and carrying phase.

F-122 latex is a collodial dispersion of solid polymer in water. The particle size is very uniform and small, ranging from approximately 0.08- to 0.15-micron. The latex, as normally furnished, has 56% solids and a viscosity of 20-25 centapoises. The pH is 6.5 - 7.5, but can be adjusted.

Briefly, the use of Saran latex reduces costs and eliminates toxicity and fire hazards which accompany the use of organic solvents formerly required for the application of similar coatings. Owing to the absence of chemical affinity between the two phases in the latex, the problem of solvent retention is also eliminated, and complete drying is much more readily accomplished. Viscosity may be easily adjusted over a wide range, permitting use in conventional coating methods including roller, doctor, and spray types.

The inherent resistance of Saran to water, chemicals, greases, oils, and solvents has been preserved in the latex, thereby widening its use in a variety of applications where functional materials are needed. In addition the latex is not confined to the coatings field, and its use in the adhesive field and in water paints will be touched upon later on.

[1] A condensation of a paper by W. A. Henson, of Dow Chemical Co., Midland, Mich., given at the New York meeting of the Technical Association of the Pulp & Paper Industry, Feb. 27, 1946.

Hermetically Sealed Envelope Paper Bags Treated with Saran F-122 Latex for Packaging Various Oils, Chemicals, and Food Products

Use Applications

The application of Saran latex to paper and paperboard contributes a number of extremely valuable protective and functional properties to this base material. These have been briefly mentioned above and include oil- and greaseproofness, chemical resistance, waterproofness, gloss and heat sealability. The degree of protection required generally dictates the amount of coating to be applied in individual instances. Approximately ½ mil coating will, in general, be sufficient for most uses. Its application is usually carried out as a converting operation by spray, roller, or spread coating methods. The unthickened latex is generally satisfactory for use with spray coaters; whereas roll coating performance is improved by the addition of a small amount of thickener. For knife or spread coating applications a

greater amount of thickener should be used to obtain maximum latex viscosity.

In greaseproof applications on various types of paper and paperboard the good mechanical properties of the latex, particularly those that have been plasticized, provide a flexible barrier which will withstand folding and scoring operations. This, together with the heat sealing properties which F-122 latex imparts, provides a convenient means of fabricating hermetically sealed envelope-type bags for packaging greasy products of various types. Corrosive chemicals and the like can similarly be safely packaged. These coatings are equally suitable for application to protective food packaging papers since they are sufficiently odorless and tasteless. (See accompanying illustration on page 390).

The waterproof nature of the dried Saran latex coating is useful for providing protection to water for wallpapers, shipping containers, gummed tape backings, and specialty products. Its application to paper twine and fiber board adds strength and durability by reason of the deposited plastic film. Saran latex coated paper is suited for cap liners where water vapor impermeability requirements are not too severe. Its solvent and chemical resistance are particularly suited for specialized applications in this field. Molded pulp articles are easily sprayed or dipped with this latex to provide a tough, attractive, durable coating.

Additional Uses

The Saran coating latex has been found useful in a broad range of applications outside the paper field. When applied to cloth, leather, plastics, and foils, they provide heat-sealable finishes of excellent appearance resistant to water, greases, oils, and a wide variety of chemicals and exhibit low rates of vapor transmission.

Water paints prepared from Saran F-122 latex have created considerable interest as corrosion resistant coatings on metal, wood, and fiberboard. They can be applied by spray or brush methods. Outstanding characteristics for this application are rapid drying rate of successive coats and the resistance to scrubbing after a one-hour drying period. This is of particular interest to bakeries, breweries, laundries, and other plants where the rapid application of a maintenance paint having good resistance to water is paramount.

Since coating applications usually require individual consideration, The Dow Chemical Co. offers technical advice and help in meeting specific requirements.

Plastics Exposition

THE Philadelphia Chapter of the Society of the Plastics Industry, in conjunction with Gimbel Bros., of Philadelphia, held an exposition of the major exhibits of the New York National Plastics Exposition. The exposition, held at the Gimbel store, was previewed on May 10 and included the following exhibitors: American Cyanamid Co.; American Extruded Products Co.; Bachman Bros., Inc.; Bakelite Corp.; Catalin Corp.; Celanese Plastics Corp.; Chemaco Corp.; Columbia Protektosite Co., Inc.; Croasdale & deAngelis, Inc.; Dow Chemical Co.; E. I. du Pont de Nemours & Co., Inc.; Durez Plastics & Chemicals, Inc.; Durite Plastics, Inc.; Goodyear Tire & Rubber Co., Inc.; Walter Kidde & Co., Inc.; Mayfair Plastics Co.; Monsanto Chemical Co.; National Plastic Products Co.; Northern Industrial Chemical Co.; Plastic Manufacturers, Inc.; Preco, Inc.; Riverside & Dan River Cotton Mills; Rohm & Haas Co.; Steiner Mfg. Co.; F. J. Stokes Machine Co.; Tennessee Eastman Corp.; Watertown Mfg. Co.; Youngstown Miller; and Ziff Davis Publishing Co.

Plastics Division to Meet with A.C.S.

THE Division of Paint, Varnish and Plastics Chemistry of the American Chemical Society is arranging to meet with the Society in Chicago, Ill., during the week of September 8. Definite meetings dates have not yet been selected, but the papers on coatings and plastics will probably be presented on September 12 and 13. The Division will again cooperate in the High Polymer Forum which, in accordance with agreements reached by the six cooperating divisions at the last meeting, will be in charge of the Division of Physical and Inorganic Chemistry. Papers intended for presentation at any of the Division's sessions or at the High Polymer Forum must be received by the appropriate divisional officers not later than July 5.

Pyroxylin-Coated Fabrics and Paper

THE following figures for pyroxylin-coated fabrics and paper are for the first quarter of 1946, as reported by the Bureau of the Census, United States Department of Commerce. The statistics, based on reports from 28 companies, represent the operations of processors who coat or impregnate fabrics or paper with soluble cotton or pyroxylin preparations, either separately or in combination with other materials. "Light" cotton fabrics include sheetings and print cloths. "Heavy" cotton fabrics include drills, ducks, sateens, broken twills, and moleskins.

	Linear Yards		
Total, (except non-fabric materials):*	March	February	January
Shipment	7,713,365	7,570,746	8,344,873
†Unfilled orders	13,034,786	13,136,719	12,786,038
Light cotton fabrics:			
Shipments	3,618,853	3,712,130	3,478,835
†Unfilled orders	5,992,628	6,293,299	6,156,183
Heavy cotton fabrics:			
Shipments	2,336,197	2,340,634	2,613,005
†Unfilled orders	4,804,620	5,157,161	5,034,480
Custom coating:‡			
Shipments	1,758,315	1,517,982	2,253,033
†Unfilled orders	2,237,538	1,686,259	1,598,375
Non-fabric materials:			
Shipments	415,792	301,959	345,548
†Unfilled orders	660,464	624,995	514,028
		Pounds	
Pyroxylin actually spread	6,301,215	6,128,964	6,754,063
Monthly capacity¶	16,907,597	16,907,597	16,932,597

* Data include an undetermined quantity of custom coating of non-fabric materials.
† Orders on hand at the close of the month, exclusive of contracts, with shipping dates unspecified.
‡ Data for "Fabrics other than cotton" are included to avoid disclosing data for individual establishments.
¶ Based on all machines suitable for pyroxylin coating, assuming 600 working hours per month and entire production on 53"-1.32 sateen coated to a finished weight of 17½ oz. per linear yd. assuming 40% solids.

Awards for Processing Machinery

AN EXCEPTIONAL opportunity for those engaged in the design, manufacture, or construction of any type of processing or plastics machinery or parts is offered by the James F. Lincoln Arc Welding Foundation, Cleveland, O., in its new $200,000 "Design-for-Progress" Award Program. "Processing or Plastics Machinery," admitted as one division of the "Industry Machinery" classification, includes any machinery used in rubber and plastics manufacturing, among other industrial fields. Processing machinery maintenance workers may also enter the competition under the program's "maintenance" classification. Four awards established for this division of the "Industry Machinery" classification are $700, $500, $250, and $150. Papers in this division are also eligible for the classificational awards of $2,500, $1,500, $1,000, and $800. Three winners of divisional and classificational awards will also be eligible for the main program awards of $10,000, $7,500, and $5,000. The principal program award, which may be won by a paper in the "Industry Machinery" classification, is $13,500. Besides these awards there will be 217 honorable mention awards of $100 each.

The "Design-for-Progress" Award Program, intended to encourage study and preparation of papers on design, research and education, application and use of arc welding, is dedicated to the belief that it will benefit industry as a whole. For this purpose the sponsors will make the results of the program available generally and thus tend to stimulate industry to greater achievement. The current award program typifies the consistent activities of the Lincoln Foundation, which has included the awarding of cash prizes to writers of winning papers on the preparation of textbooks, on farming, and on practically all types of commercial and industrial progress involving welding. Complete details of the $200,000 "Design-for-Progress" Award Program which closes June 1, 1947, may be obtained by writing the Secretary, The James F. Lincoln Arc Welding Foundation, Cleveland 1, O.

Myron T. Bennett
With United Carbon
(See page 403)

Donald Simonds
Advanced by Cabot
(See page 412)

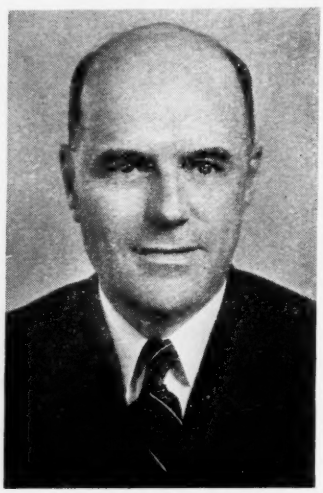
Jack R. Moore
Akron Group Chairman
(See page 387)

Russell De Young
Goodyear Airship Executive
(See page 408)

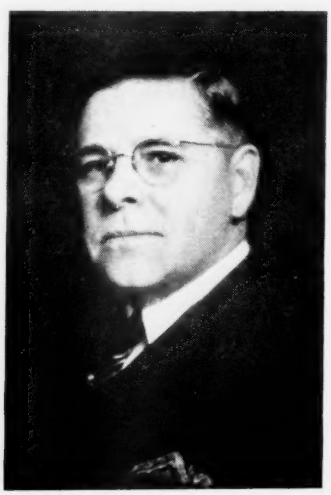
W. W. Llewellyn, Jr.
Firestone Product Manager
(See page 407)

Edgar S. Thompson
Joins Farrel-Birmingham
(See page 412)

Marshall Dill
Now under Witco
(See page 414)



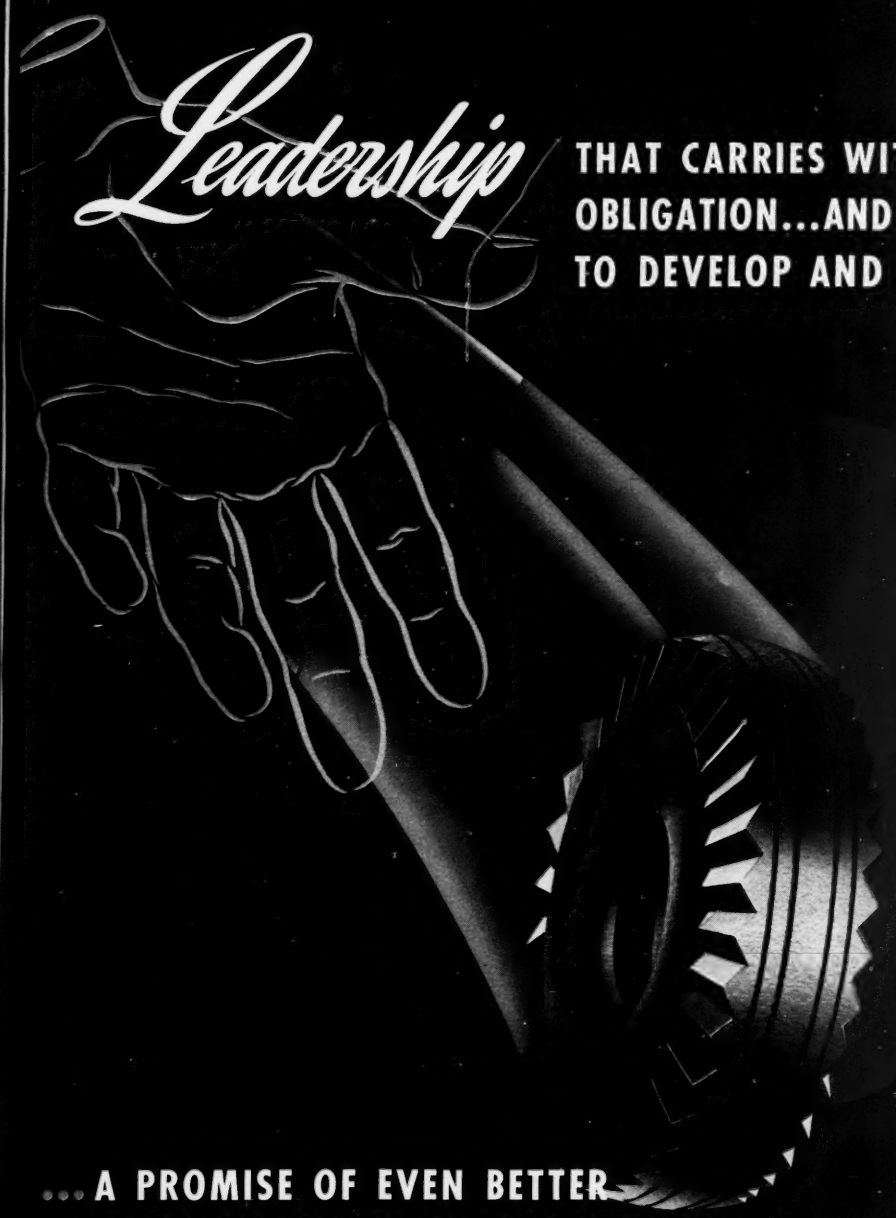
W. B. Brewer
Master Tire President
(See page 406)



Blank & Stoller

W. W. Higgins
General Sales Consultant
(See page 403)

RLD



Leadership

THAT CARRIES WITH IT THE OBLIGATION...AND THE ABILITY... TO DEVELOP AND IMPROVE

...A PROMISE OF EVEN BETTER CARBON BLACKS FOR THE FUTURE

MICRONEX
A COLUMBIAN COLLOID
ITS ROLE IN THE DRAMA OF CARBON REINFORCEMENT

ALWAYS THERE IS A *Leader*

COLUMBIAN CARBON COMPANY

400 TONS OF SMOKE A DAY

COLUMBIAN CARBON CO. MANUFACTURER • **BINNEY & SMITH CO.** DISTRIBUTOR

MICRONEX

IN 1912 the fact that rubber could be reinforced by the addition of carbon black was discovered through research in the tire industry. The carbon black used in this pioneering work was the material later known as MICRONEX. The supply of carbon black was limited at that time so the discovery of carbon reinforcement would have been of little use without the major production program which we promptly inaugurated and successfully carried out.

This effort to make channel carbon black widely available for rubber established leadership in the field. MICRONEX became the king of rubber pigments and has ever since been recognized as the standard in quality and uniformity for rubber compounding.

STATEX-B *The carbon for dynamic reinforcement*

STATEX-93 *The carbon for heavy-duty reinforcement*

FURNEX
The high resilience carbon

●

COLUMBIAN CARBON CO.
MANUFACTURER

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DISTRIBUTOR

RUBBER WORLD
NEWS of the MONTH

Highlights—

Despite strikes and rumors of strikes on a national scale in the railroad, coal, and other industries, the rubber industry maintained its history-making production level, particularly in tires, during the month of May. With the accompanying unusual high demand for raw and component materials, an increase in natural rubber imports was of considerable significance, and the CPA moved to reactivate its Component Materials Staff and expand its Technical Operations Branch to help keep production going at a high level. R. S. Wilson, of Goodyear, and A. L. Viles, of the RMA, both reported that barring shortages the tire industry should exceed its 1946 production program. With the railroad strike settled, one of the threats to production in the rubber as well as other major industries was removed, but the outlook was still uncertain on May 27 with regard to a settlement of the coal strike. For the remainder of 1946, the activity of the rubber industry is directly dependent on the country's basic economic situation.

Peak Production Maintained Despite Coal and Railroad Strikes

The rubber industry in general and the tire branch in particular maintained a very high level of production during most of May. The coal strike truce provided a breathing spell during mid-May, and the railroad strike truce also enabled operations to continue in spite of the continuing shortage of component materials. An adequate supply of passenger-car tires to meet this summer's demand was forecast by R. S. Wilson, vice president of Goodyear Tire & Rubber Co., who also predicted a development of synthetic rubber during the next 25 years comparable to that of rayon between 1923 and 1946. Natural rubber imports increased appreciably during February and March, and the natural rubber inventory at the end of March was 180,000 long tons. GR-S production increased in March by 8,000 tons over February. However, the maintenance of high production in the rubber goods manufacturing industry is now directly dependent on the basic economic situation generally, rather than on any extra efforts by the industry itself.

Wilson on Tires and Synthetic Rubber

Mr. Wilson early in May reported that the tire branch of the industry should be able to produce 66,000,000 passenger-car tires in 1946, as compared with the 50,000,000 produced in 1941. Goodyear already has built as many of these tires in the first four months of this year as it did during the first 10 months of 1945.

Goodyear field engineers have just completed a careful inspection of tires on 16,469 automobiles in 17 different cities from coast to coast, with the following results:

It was found that 41% of the tires now on the road are in good condition and should last out the period during which tire supply and demand are being brought into balance.

Forty-five per cent. of the nation's passenger tires were discovered on the average to be half worn, and these tires should not require replacement for some months to come.

Only 14% of tires in use have smooth treads or are in need of early replacement.

Mr. Wilson's conclusion is that there will be sufficient production to take care of the needy 14% provided production is properly distributed. As the 45% group's tires wear down to the point of replacement, the industry will be able to meet that demand, also, and by that time the supply of tires should be in balance with the demand.

The major danger in this calculation, Mr. Wilson said, is that many motorists, fearing a shortage, will try to buy new tires in advance of their actual requirements. This situation can be avoided, he stated, if the tire owner will put his tire requirements in the hands of a good, capable, reliable dealer who will check his tires and see that necessary replacements are set aside for him when he gets down to the point of actual need.

Of course the calculation is also based on the assumption that there will be no interruptions of tire production because of material shortages or for any other reason.

On truck tires, industry production is almost up to requirements, and the tire supply will meet the public demand within a matter of weeks. Forecast for farm tractor tires, although the output is greater than ever, is that there will be a continued shortage in this field for the remainder of the year, it was stated.

Mr. Wilson spoke on "The Future of Synthetic Rubber" before the 1946 Spring Safety and Fire Conference of the Office of Rubber Reserve, RFC, held in Detroit on May 13. He first paid tribute to the outstanding safety record that has been turned in by the entire synthetic rubber manufacturing industry and then gave special accolade to the safety men of the copolymer plants.

Mr. Wilson emphasized that since synthetic rubber was here to stay, it should have a name other than the clumsy and inaccurate cognomen of synthetic rubber. Reviewing the history of rayon, it was pointed out that this was first called artificial silk, but finally it was given the name rayon; and once taken out of the artificial class and given a name of its own, it use grew even during the depression of the 30's. The developments that took place in gradually removing the shortcomings of rayon for tire cord were discussed, and it was explained that this was possible because the material was synthetic and was therefore adaptable to modification and change more readily than a natural product. In 1923 only 30,000,000 pounds of rayon were used for all purposes, while in 1946 more than 200,000,000 pounds will be consumed for tire uses alone, and 300,000,000 pounds could be used if the rayon producing facilities were available, it was said.

A similar development has and will continue to take place with synthetic rubber, but as artificial rubber—or substitute rubber—it has not so good a chance as it would have if it were dignified with a name of its own and set up as a substance in its own right, Mr. Wilson declared. It was therefore suggested that a committee of the Office of Rubber Reserve should be formed to work closely with the Division of Rubber Chemistry of the American Chemical Society and the Public Relations Division of The Rubber Manufacturers Association, Inc., in order to assemble suggestions for a new name for synthetic rubber.

Mr. Wilson predicted that with synthetic rubber in the course of the next 25 years the following events may take place:

At least one *major* improvement in synthetic rubber will put in its appearance.

Somewhere between 10 and 20 minor improvements will gradually and almost imperceptibly take place.

Two or three of the big companies will each bring out of their research laboratories a startling new application of the substance.

Countless little fellows will discover countless new uses—many of them will never amount to much, but some of them will blossom into important new businesses.

On the subject of national security, America must develop a minimum production of 100,000 tons a year of natural rubber within its own protection zone, which together with our synthetic rubber industry would make us independent of natural rubber production in the Far East if the sea lanes are ever closed again, Mr. Wilson said.

What the rubber industry and the United States public want is a low and stable price for rubber, and the price of synthetic rubber is bound to develop both a ceiling and floor for the price of natural rubber with a consequent saving to the industry and the public.

With regard to who should own and operate the synthetic rubber plants, Mr. Wilson emphasized that the United States should see to it that a given proportion of the rubber used within the boundaries of the United States should be synthetic rubber manufactured in the synthetic plants within our own boundaries. The many other factors involved in the problem of synthetic plant ownership and operation are more controversial, and Mr. Wilson indicated that he felt we would be wiser to continue centralized government control a little longer until some of the unknown factors resolve themselves. He stressed the point that he was not advocating a nationalized synthetic rubber industry, but that he was suggesting that since the synthetic rubber manufacturing industry was built by the government in the time of a national emergency and since the synthetic rubber industry has one element in it which is peculiar as compared to other

ESTIMATED AUTOMOTIVE PNEUMATIC CASING AND TUBE SHIPMENTS, PRODUCTION, AND INVENTORY—MARCH, 1946, FEBRUARY, 1946, FIRST THREE MONTHS, 1946-1945

	Original Equipment	Replacement	Export	Total Shipments	% of Change from Preceding Month	Production during Month	% of Change from Preceding Month	Inventory End of Month	% of Change from Preceding Month
PASSENGER CASINGS									
March, 1946	516,187	4,738,609	46,835	5,301,631	+ 22.35	5,310,273	+15.81	2,383,421	—4.50
February, 1946	269,988	4,033,792	29,478	4,333,258		4,585,398		2,495,805	
First Three Months, 1946	1,147,707	12,756,462	111,717	14,015,886		14,600,763		2,383,421	
First Three Months, 1945	65,660	5,315,843	53,557	5,435,060		5,027,427		704,967	
TRUCK & BUS CASINGS									
March, 1946	213,357	1,047,801	58,200	1,319,358	+ 16.25	1,375,571	+13.12	1,008,780	+1.80
February, 1946	205,556	866,156	63,268	1,134,980		1,216,021		990,944	
First Three Months, 1946	633,497	2,799,662	177,336	3,610,495		3,859,290		1,008,780	
First Three Months, 1945	1,721,694	3,587,679	39,435	5,348,808		5,370,008		787,500	
TOTAL CASINGS									
March, 1946	729,544	5,786,410	105,035	6,620,989	+ 21.08	6,685,844	+15.24	3,392,201	—2.71
February, 1946	475,544	4,899,948	92,746	5,468,238		5,801,419		3,486,749	
First Three Months, 1946	1,781,204	15,556,124	289,053	17,626,381		18,460,053		3,392,201	
First Three Months, 1945	1,787,354	8,903,522	92,992	10,783,868		10,397,435		1,492,467	
PASSENGER TRUCK & BUS TUBES									
March, 1946	764,409	4,775,924	108,523	5,648,856	+ 28.79	5,839,622	+19.81	4,518,903	+2.29
February, 1946	491,670	3,806,159	88,391	4,386,220		4,874,026		4,417,884	
First Three Months, 1946	1,857,900	12,184,635	279,488	14,322,023		15,353,410		4,518,903	
First Three Months, 1945	1,801,933	7,800,384	56,841	9,659,158		10,181,732		3,248,694	

industry: namely, the element of national security, we should move slowly and carefully as we shift this important and growing industry from government control to private control.

RMA Reports

The Rubber Manufacturers Association reported on May 13 that the continuation of textile shortages is keeping rubber manufacturers on a hand-to-mouth basis of operation despite recent government set-asides designed to move hard-to-find cotton fabrics into the hands of industrial users. This fact was apparent in returns reaching the Association as part of its second survey of manufacturers to determine fabric inventory positions which have been critically low since the first of the year.

Slight improvement was shown in some types of fabric as compared with the situation as reviewed about April 1. At that time many manufacturers had been unable to obtain as much as a yard of their second-quarter fabric requirements and were threatened with shutdowns.

Rubber manufacturers cited as principal reasons for their inability to obtain fabrics vital to their own factory operations, the claims of textile mill operators that they have been confused by CPA orders affecting the distribution of fabrics and the further claims of the cotton people that they cannot move their goods under present OPA ceilings. Several rubber manufacturers cited the fact that some cotton mills have diverted their production to more profitable constructions; while others blamed reduced cotton mill production. Labor shortages, scarcity of coal and starch, and heavy set-asides for export and the bag trade were other reasons given for the tight cotton goods situation.

Scarcities have been felt most acutely by manufacturers of friction tape and coated materials. As one of the major users of broad woven fabrics, the coating division reported extremely short supplies of all types of cloth. For example, only two out of 22 reporting companies have been able to obtain more than 50% of their second-quarter sheeting requirements, the RMA report revealed. Others report having obtained up to 50%, but in most cases less, of their requirements in print cloths, sateens, drills, and twills. Osnaburgs were reported by this group as in somewhat easier, but still not adequate supply.

Sheetings continue tight straight across the board. Manufacturers of tires, mechanical rubber goods, and rubber footwear reported little improvement in supplies of sheeting in the month of April. Most users found some improvement, however, in supplies of osnaburgs, belt and hose duck, enameling ducks, and chafer fabrics.

The survey showed that the threat of rubber plant shutdowns, an immediate reality in April, had receded slightly. The Association noted, however, that both shipments and overall inventory continue so low that forward scheduling of production is almost impossible and that any material lessening of supplies would still bring serious interruptions of operations.

In its regular monthly report on tire production the RMA stated that passenger-car tire production increased sharply in March to 5,310,273 units. If this production were sustained for the rest of the year, a record output of more than 63,000,000 units would result, it was said.

The report also covered production of automotive pneumatic tubes and casings for the first quarter of 1946. It disclosed that passenger-car tire output for the three months had climbed to 14,600,763 units, as compared with first-quarter production of 12,607,000 units in 1940, the year in which the industry posted its present peacetime annual record of 50,965,000 tires in passenger-car sizes.

Noting that weekly production figures since March have continued to climb, A. L. Viles, RMA president, said, "As of today (May 21), the only thing that stands between manufacturers and industry's goal of 66 million passenger-car tires in 1946 is the threat of shortages in component materials and potential transportation and fuel strikes. Barring development of such shortages, the industry may well exceed its production program. Vacation periods may also be a limiting factor during the summer months.

"With the industry fully converted and its production far above previous peacetime levels, tire plants are consuming raw materials at an unprecedented rate. When this record demand for tire materials is squared against abnormally short supplies of textiles, casein, resins and other components, the reality of these shortages as a threat to uninterrupted production is apparent," Mr. Viles observed.

The monthly and quarterly production figures are given in the accompanying table. In addition there are also given tables showing the production, estimated monthly shipments, and inventory of automotive pneumatic casings for the years 1941, 1942, 1943, 1944, and 1945, as provided by the RMA. These data were not available during the war years, and this is the first compilation in this form so released. (See pages 397-399 for the annual figures.)

Overall Industry Situation

Because the rubber industry has been fortunate in achieving a higher degree of reconversion than most other industries and has reached a production level above that of its best prewar years, it is more than likely that from now on its ability to maintain peak output will be dependent not on its own efforts, but on the general level of all industrial activity. The supply of its major raw material, rubber, should be adequate, for although GR-S production is temporarily limited by the prior need of grain for food, the natural rubber supply has increased sufficiently to fill the gap. The shortage of other material components such as fabrics, bead wire, resins, etc., by virtue of labor trouble in the supplier industries will, however, curtail rubber industry operations.

Production of GR-S increased from 43,563 long tons in February to about 51,500 tons in March, and production of GR-S for the first three months of 1946 was about 143,500 long tons. Consumption of GR-S during February was 53,251 long tons and about 62,000 long tons in March. During February, 6,154 long tons of GR-S were exported and 17,100 tons during March. Although exports of GR-S are expected to be higher in April, they will be much less during the balance of the year.

The production of GR-I and GR-M during the first quarter of 1946 was about 15,500 and 9,000 long tons, respectively, with consumption running at about 22,000 tons on the former and 9,700 tons on the latter.

The two-day railroad strike which began on May 23, if it had continued for any length of time, would have closed

down most rubber industry plants within a few weeks or days in some cases. However at this writing (May 27) the outlook is still not good because of the possible effect of a continuation of the coal strike, following the expiration of the two weeks' truce on May 26, without a settlement of this dispute. It is not anticipated that this or any other strike threat will be permitted to throttle the nation's industries for an extended period in view of the present attitude of the administration, Congress, and the general public.

On the all-embracing subject of the national policy on rubber as being formulated by the Batt Inter-Agency Committee, it is understood that as a result of a conference with Congressional leaders, it has been agreed not to introduce any legislation on the subject at this session of Congress. The second report of the Batt Committee is expected about August 1 and is to contain suggestions for legislative action together with the other details on plant disposal and research plans as indicated in the preliminary report of February 19.

The 1946 production schedules for passenger-car tires will be increased 3,150,000 units to help meet the unprecedented demand; while schedules for other types of tires in more ample supply will be revised downward, the CPA said on May 27 following a recent meeting with the Rubber Industry Advisory Committee. The new production goal is therefore set at 69,150,000 units, as compared to 66,000,000 scheduled at the beginning of the year, according to W. James Sears, director of the CPA's Rubber Division.

To attain this increased production, Mr. Sears indicated that because of the rubber supply situation the industry will find it necessary to reduce schedules on such items as large truck and bus tires, some types of tractor tires, as well as tires for farm implements and special purposes.

Industry men and CPA officials agreed that rubber supplies would not exceed the 903,000-ton estimate made about the first of the year. This amount of rubber included 190,000 tons of natural rubber, 610,000 tons of GR-S, and 100,000 tons of special-purpose synthetics. The political and economic developments in the Far East since V-J Day make it impossible at this time to count on more than 250,000 tons of natural rubber in 1946 (of which 190,000 tons will be available for consumption, and the rest will be stockpiled by the government), it was reported. GR-S processors must operate at full capacity to attain the 610,000-ton estimate, even with the allocation of a small amount of alcohol in the second quarter of the year.

CPA listed the following comparison of tire production estimates:

Type of Tire	Plan of January, 1946	Companies' Estimates March, 1946	Plan of May, 1946
Truck and bus	13,760,000	16,080,609	13,860,609
Tractor	3,803,000	4,735,013	4,267,811
Passenger	66,000,000	70,450,000	69,150,805

In addressing the first session of the Advisory Committee held since V-J Day, CPA officials commended the rubber manufacturing industry on an "outstanding reconversion job." CPA spokesman pointed out that while it was CPA policy to facilitate increased production wherever possible, the reconversion in the rubber industry has been so rapid that it has outstripped the ability to obtain component materials in full quantities. At the moment, bead wire, required in the manufacture of every tire is exceptionally short, it was reported. Production of

1945 Estimated U.S.A. Automotive Pneumatic Casings Shipments, Production, and Inventory

	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory
Passenger Car						
January	32,809	1,909,455	23,532	1,965,796	1,984,774	1,156,414
February	14,979	1,623,799	10,306	1,649,084	1,525,271	1,036,037
March	17,872	1,782,589	19,719	1,820,180	1,517,382	704,967
April	26,510	1,205,118	11,190	1,242,818	1,336,427	725,180
May	24,714	1,506,161	16,461	1,547,336	1,715,400	810,566
June	27,039	1,773,791	18,651	1,819,481	1,968,907	994,884
July	34,156	1,819,835	8,714	1,862,705	1,932,219	1,016,615
August	56,684	2,129,802	21,775	2,208,261	2,477,388	1,246,012
September	136,438	2,359,876	15,801	2,512,115	2,591,465	1,323,303
October	173,301	3,066,581	20,803	3,260,685	3,659,959	1,672,546
November	341,392	3,108,088	25,663	3,475,143	3,691,146	1,837,516
December	229,401	3,177,210	29,760	3,436,371	3,799,454	2,214,517
Total Year	1,115,295	25,462,305	222,375	26,799,975	28,199,792	
Truck and Bus						
January	567,568	1,092,965	13,437	1,673,970	1,765,058	856,267
February	569,365	1,151,998	8,352	1,729,715	1,779,510	913,459
March	584,761	1,342,716	17,646	1,945,123	1,825,440	787,500
April	547,388	1,051,514	12,236	1,611,138	1,634,401	786,057
May	543,652	1,065,481	20,778	1,629,911	1,648,290	763,870
June	425,892	1,052,707	24,295	1,502,894	1,466,146	737,624
July	374,383	684,364	14,489	1,073,236	1,112,716	782,877
August	326,859	752,899	37,345	1,117,103	1,167,432	825,942
September	210,205	681,915	34,045	926,165	829,736	718,454
October	276,358	803,683	32,009	1,112,050	1,080,379	679,689
November	294,181	670,097	31,997	996,275	989,237	677,014
December	148,381	665,772	35,399	849,552	1,025,776	862,664
Total Year	4,868,993	11,016,111	282,028	16,167,132	16,324,121	
Total Automotive						
January	600,377	3,002,420	36,969	3,639,766	3,749,832	2,012,681
February	584,344	2,775,797	18,658	3,378,799	3,304,781	1,949,496
March	602,633	3,125,305	37,365	3,765,303	3,342,822	1,492,467
April	573,898	2,256,632	23,426	2,853,956	2,970,828	1,511,237
May	568,366	2,571,642	37,239	3,177,247	3,363,690	1,574,436
June	452,931	2,826,498	42,946	3,322,375	3,435,053	1,732,508
July	408,539	2,504,199	23,203	2,935,941	3,044,935	1,799,492
August	383,543	2,882,701	59,120	3,325,364	3,644,820	2,071,954
September	346,643	3,041,791	49,846	3,438,280	3,421,201	2,041,757
October	449,659	3,870,264	52,812	4,372,735	4,740,338	2,352,235
November	635,573	3,778,185	57,660	4,471,418	4,680,383	2,514,530
December	377,782	3,842,982	65,159	4,285,923	4,825,230	3,077,181
Total Year	5,984,288	36,478,416	504,403	42,967,107	44,523,913	

1944 Estimated U.S.A. Automotive Pneumatic Casings Shipments, Production, and Inventory

	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory
Passenger Car						
January	16,691	997,183	4,280	1,018,154	1,196,998	1,324,272
February	11,335	930,877	5,205	947,417	1,119,104	1,500,064
March	6,001	985,848	8,404	1,000,253	1,229,226	1,699,006
April	5,731	1,136,879	6,326	1,148,936	1,195,309	1,888,399
May	7,482	1,477,066	9,951	1,494,499	1,381,303	1,623,014
June	7,665	2,103,786	11,243	2,122,694	1,455,256	965,142
July	19,660	1,661,380	12,815	1,693,855	1,460,712	735,779
August	24,673	1,439,063	12,642	1,476,378	1,655,502	905,154
September	21,517	1,640,150	8,115	1,669,782	1,794,962	967,757
October	30,929	1,910,011	23,006	1,963,946	2,065,099	1,084,472
November	30,229	1,950,471	11,248	1,991,948	2,128,858	1,231,836
December	26,173	2,097,204	16,797	2,140,174	2,136,409	1,217,615
Total Year	208,086	18,329,918	130,032	18,668,036	18,818,738	
Truck and Bus						
January	526,001	557,059	8,547	1,091,607	1,157,157	823,641
February	504,687	587,165	11,275	1,103,127	1,163,701	904,184
March	529,343	701,709	12,739	1,243,791	1,274,987	957,239
April	461,602	657,606	10,145	1,129,353	1,168,838	1,021,809
May	522,210	711,226	12,931	1,246,367	1,247,161	1,011,071
June	535,693	727,720	11,676	1,275,089	1,135,502	893,266
July	540,148	622,848	12,490	1,175,486	1,097,531	826,424
August	619,647	613,976	10,629	1,244,252	1,245,867	819,940
September	558,709	645,545	8,507	1,212,761	1,221,896	825,333
October	529,458	676,626	11,750	1,217,834	1,220,125	838,852
November	572,192	700,933	9,179	1,282,304	1,265,956	832,751
December	546,738	906,546	12,700	1,465,984	1,428,112	795,020
Total Year	6,446,428	8,108,959	132,568	14,687,955	14,626,833	
Total Automotive						
January	542,692	1,554,242	12,827	2,109,761	2,354,155	2,147,913
February	516,022	1,518,042	16,480	2,050,544	2,282,805	2,404,248
March	535,344	1,687,557	21,143	2,244,044	2,504,213	2,656,245
April	467,333	1,794,485	16,471	2,278,289	2,364,147	2,910,208
May	529,692	2,188,292	22,882	2,740,866	2,628,464	2,634,085
June	543,358	2,831,506	22,919	3,397,783	2,590,758	1,858,408
July	559,808	2,284,228	25,305	2,869,341	2,558,243	1,562,203
August	644,320	2,053,039	23,271	2,720,630	2,901,369	1,725,094
September	580,226	2,285,695	16,622	2,882,543	3,016,858	1,793,090
October	560,387	2,586,637	34,756	3,181,780	3,285,224	1,923,324
November	602,421	2,651,404	20,427	3,274,252	3,394,814	2,064,587
December	572,911	3,003,750	29,497	3,606,158	3,564,521	2,012,635
Total Year	6,654,514	26,438,877	262,600	33,355,991	33,445,571	

1943 Estimated U.S.A. Automotive Pneumatic Casings Shipments, Production, and Inventory

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory
Passenger Car						
January	6,115	1,231,581	3,546	1,241,242	603,988	3,759,884
February	6,321	1,108,137	6,401	1,120,859	398,112	2,992,363
March	6,279	676,607	7,459	690,345	292,428	3,559,961
April	6,249	720,413	4,774	731,436	119,521	1,920,724
May	7,248	882,396	3,625	893,269	164,224	1,208,630
June	2,066	855,575	2,600	860,241	383,867	704,008
July	1,825	654,638	6,721	663,184	627,640	690,553
August	3,693	736,974	9,040	749,707	735,001	618,800
September	8,487	821,985	7,236	837,708	892,595	673,215
October	10,177	972,149	10,394	992,720	1,079,029	770,462
November	11,642	982,526	3,811	997,979	1,184,392	967,403
December	11,815	962,464	6,048	980,327	1,139,643	1,132,259
Total Year	81,917	10,605,445	71,655	10,759,017	7,620,440	
Truck and Bus						
January	444,749	562,425	23,319	1,030,493	991,628	1,803,534
February	440,178	650,507	18,689	1,109,374	1,027,668	1,725,598
March	488,322	763,067	16,923	1,268,312	1,174,414	2,543,151
April	502,855	771,807	10,836	1,285,498	1,146,862	1,906,428
May	570,740	688,749	12,925	1,272,414	1,099,439	1,385,801
June	491,555	788,923	11,014	1,291,492	1,199,364	698,752
July	512,519	698,894	8,828	1,220,241	1,058,310	1,112,388
August	521,539	744,732	10,799	1,277,070	967,029	614,964
September	525,036	593,907	9,778	1,128,721	974,543	767,632
October	515,619	622,723	10,205	1,148,547	1,056,120	713,047
November	502,581	504,095	10,653	1,017,329	1,053,019	771,473
December	530,010	551,389	9,831	1,091,230	1,054,393	751,238
Total Year	6,045,703	7,941,218	153,800	14,140,721	12,802,789	
Total Automotive						
January	450,864	1,794,006	26,865	2,271,735	1,595,616	5,563,418
February	446,499	1,758,644	25,090	2,230,233	1,425,780	4,717,961
March	494,601	1,439,674	24,382	1,958,657	1,466,842	5,103,112
April	509,104	1,492,220	15,610	2,016,934	1,266,383	3,827,152
May	577,988	1,571,145	16,550	2,165,683	1,263,663	2,594,431
June	493,621	1,644,498	13,614	2,151,733	1,583,231	1,402,760
July	514,344	1,353,532	15,549	1,883,425	1,685,950	1,802,941
August	525,232	1,481,706	19,839	2,026,777	1,702,030	1,233,764
September	533,523	1,415,892	17,014	1,966,429	1,867,138	1,440,847
October	525,796	1,594,872	20,599	2,141,267	2,135,149	1,483,509
November	514,223	1,486,621	14,464	2,015,308	2,237,411	1,738,876
December	541,825	1,513,853	15,879	2,071,557	2,194,036	1,883,497
Total Year	6,127,620	18,546,663	225,455	24,899,738	20,423,229	

1942 Estimated U.S.A. Automotive Pneumatic Casings Shipments, Production, and Inventory

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory
Passenger Car						
January	429,989	58,344	7,095	495,428	232,552	2,830,478
February	135,537	77,915	7,456	220,908	160,559	2,771,291
March	95,601	53,131	8,059	156,791	163,764	2,916,418
April	51,776	147,316	1,666	200,758	95,767	3,609,397
May	—20,588	137,496	—409	116,499	29,537	4,170,791
June	39,976	84,930	1,071	125,977	61,361	4,272,478
July	6,050	156,298	603	162,951	73,945	4,174,471
August	31,366	138,734	2,184	172,284	70,394	4,097,436
September	40,495	189,968	3,959	234,422	68,892	3,923,627
October	33,213	375,579	1,900	410,692	495,728	4,036,171
November	27,818	403,648	1,281	432,747	651,231	4,285,273
December	764	841,545	2,987	845,296	648,143	4,432,038
Total Year	871,997	2,664,904	37,852	3,574,753	2,751,873	
Truck and Bus						
January	600,733	164,864	14,926	780,523	1,211,972	1,691,835
February	176,240	300,895	32,525	509,660	181,522	1,753,640
March	124,381	453,813	17,588	595,782	1,067,042	1,864,812
April	478,543	541,739	8,111	1,028,393	1,084,167	1,984,255
May	580,169	540,972	14,888	1,136,029	1,116,220	1,969,629
June	692,187	454,907	16,625	1,163,719	1,115,026	1,922,149
July	550,717	653,709	14,034	1,218,460	1,327,971	2,081,081
August	505,883	601,393	6,567	1,113,843	1,226,911	2,146,006
September	564,539	710,705	3,989	1,279,233	1,205,904	2,078,564
October	545,632	694,888	14,346	1,254,866	1,084,521	1,920,397
November	497,322	506,405	10,627	1,014,354	921,219	1,850,588
December	531,666	513,574	15,247	1,060,487	1,053,398	1,815,169
Total Year	5,848,012	6,137,864	169,473	12,155,349	12,595,873	
Total Automotive						
January	1,030,722	223,208	22,021	1,275,951	1,444,524	4,522,313
February	311,777	378,810	39,981	730,568	342,081	4,524,931
March	219,982	506,944	25,647	752,573	1,230,806	4,781,230
April	530,319	689,055	9,777	1,229,151	1,179,934	5,593,652
May	559,581	678,468	14,479	1,252,528	1,145,757	6,140,420
June	732,163	539,837	17,696	1,289,696	1,176,387	6,194,627
July	556,767	810,007	14,637	1,381,411	1,401,916	6,255,552
August	537,249	740,127	8,751	1,286,127	1,297,305	6,243,442
September	605,034	900,673	7,948	1,513,655	1,274,796	6,002,191
October	578,845	1,070,467	16,246	1,665,558	1,580,249	5,956,568
November	525,140	910,053	11,908	1,447,101	1,572,450	6,135,861
December	532,430	1,355,119	18,234	1,905,783	1,701,541	6,247,207
Total Year	6,720,009	8,802,768	207,325	15,730,102	15,347,746	

NOTE: The figures shown for original equipment and export shipments are distorted by the fact that during the year government restrictions required vehicle manufacturers to return excess stocks and exporters to return some stocks originally intended for foreign customers.
It will be noted that inventory figures in certain months increased out of all proportion to production. This is due to the fact that dealers made large returns of stocks during the year to manufacturers, under a government sponsored program, and the shipment figures were not adjusted for these returns.
The year 1942 was a year of considerable confusion in the industry; therefore these figures must not be used to indicate trends. They are issued so that there will not be a break in the continuity of easing statistics.

bead wire has been low since the steel strike and should the coal strike continue, there will be even less bead wire available.

Natural Rubber Imports Up

The amount of natural rubber reaching the United States from the Far East increased considerably during February and March and continued during April. Imports during February totaled 35,104 long tons, as compared with 19,750 long tons received during January, and preliminary figures for imports during March were 35,329 long tons. It is estimated that imports for the first four months of this year will amount to 120,000 long tons, which is an appreciable percentage of the anticipated 1946 receipts of between 250,000 and 300,000 long tons. With the natural rubber stockpile at the end of March at 180,000 long tons and growing steadily, it may be possible that monthly allocations of natural rubber may be increased in the near future above their present 15,000-ton figure.

This improvement in the natural rubber picture is reported as being due to the improved political situation in the Far East, except for the Netherlands India, and the fact that production of new rubber in Malaya, owing to rehabilitation of reoccupied areas, is progressing more rapidly than had been expected. It is estimated that by the end of 1946, Malayan native rubber farmers will be producing at 90% of capacity and the big plantations at between 40 and 50%. Shipments of rubber from Indo-China have also been greater than estimated.

With this welcome and unexpected increase in the natural rubber supply, it is considered quite possible that the present price of 20¼¢ a pound for natural rubber at Far Eastern ports will be continued by a new agreement with the British and Dutch producers when the present agreement expires on June 30, 1946. The new agreement will probably be for a period of at least six months and maybe longer.

OPA Tire Price Increase

Although an increase in the price of tires was supposed to be announced during May, no official word was received up to May 27. It is understood that the increase was to amount to 3.4% on passenger-car tires and 1.4% on truck tires. If granted, this would mean that passenger car tires would cost from 50 to 80¢ more than previously, ($15.70, as compared to $15.20 for a 6.00x16 tire); while the truck tire increase will be in the form of a reduction of say from 10 to 8.6% in the discount allowed purchasers by the truck tire dealer.

The OPA has been studying current costs and profits as compared with those during the 1936-39 period in order to arrive at a decision for granting price relief to the tire manufacturers. The increase is lower than many anticipated.

A possible contributing reason for the small amount of increase that is expected to be granted is the continuation of reports from various sections of the country of the sale of large truck tires below OPA ceiling prices. The New York Times on May 14 carried a report that large truck tires in the metropolitan area were being sold at prices from 10 to 20% below ceiling. It was further stated that some industry spokesmen attribute the "softening" of the market in large truck tires to be due to the recent

1941 Estimated U.S.A. Automotive Pneumatic Casings Shipments, Production, and Inventory

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory
Passenger Car						
January	1,947,528	2,037,920	82,514	4,067,962	4,609,980	7,847,816
February	2,163,801	1,865,945	90,593	4,120,339	4,351,649	8,057,485
March	2,242,453	2,305,363	92,872	4,640,688	4,790,808	8,134,429
April	1,972,223	3,036,886	40,928	5,050,037	4,848,090	7,960,637
May	2,254,993	4,347,003	41,697	6,643,693	5,083,482	6,476,088
June	2,180,355	4,244,937	44,388	6,469,680	5,356,702	5,365,459
July	1,583,719	3,678,879	45,358	5,307,956	4,688,547	4,760,991
August	753,507	3,557,549	38,372	4,349,428	4,104,188	4,515,900
September	1,106,503	3,056,479	37,103	4,200,085	3,710,856	4,011,515
October	1,550,259	3,146,675	38,415	4,735,349	3,819,978	3,065,954
November	1,342,082	1,827,434	24,262	3,193,778	3,128,078	3,015,207
December	758,270	1,013,198	9,921	1,781,389	1,899,560	3,165,132
Total Year	19,855,693	34,118,268	586,423	54,560,384	50,391,918	
Truck and Bus						
January	343,681	386,810	51,295	781,786	876,316	1,949,437
February	382,319	337,352	56,330	776,001	809,618	1,971,318
March	395,613	423,194	57,760	876,567	894,751	2,014,432
April	360,204	497,437	91,584	949,225	991,242	1,997,212
May	443,806	483,446	104,883	1,032,135	1,007,913	1,897,236
June	414,904	616,344	101,065	1,132,313	1,022,142	1,722,278
July	414,717	634,163	92,770	1,141,650	889,258	1,473,758
August	368,720	584,858	91,334	1,044,912	879,236	1,318,209
September	362,720	607,831	88,589	1,059,140	852,116	1,142,566
October	444,922	607,282	79,916	1,132,120	1,017,231	1,056,882
November	462,197	332,682	60,030	854,909	838,367	1,027,788
December	530,812	264,746	27,234	822,792	1,070,088	1,270,933
Total Year	4,924,615	5,776,145	902,790	11,603,550	11,148,278	
Total Automotive						
January	2,291,209	2,424,730	133,809	4,849,748	5,486,296	9,797,253
February	2,546,120	2,203,297	146,923	4,896,340	5,161,267	10,028,803
March	2,638,066	2,728,557	150,632	5,517,255	5,685,559	10,148,861
April	2,332,427	3,534,323	132,512	5,999,262	5,839,332	9,957,849
May	2,698,799	4,830,449	146,580	7,675,828	6,091,395	8,373,324
June	2,595,259	4,861,281	145,453	7,601,993	6,378,844	7,087,737
July	1,998,436	4,313,042	138,128	6,449,606	5,577,805	6,234,749
August	1,122,227	4,142,407	129,706	5,394,340	4,983,424	5,834,109
September	1,469,223	3,664,310	125,692	5,259,225	4,562,972	5,154,081
October	1,995,181	3,753,957	118,331	5,867,469	4,837,209	4,122,836
November	1,804,279	2,160,116	84,292	4,048,687	3,966,445	4,042,885
December	1,289,082	1,277,944	37,155	2,604,181	2,969,648	4,436,065
Total Year	24,780,308	39,894,413	1,489,213	66,163,934	61,540,196	

order of the CPA increasing the amount of natural rubber which could be used in large truck tires from 35 to 65%. They said that dealers wished to get rid of the previously purchased 35% natural rubber tires and were willing to make price concessions.

Also, approximately $10,000,000 worth of new tires and tubes were offered, first to federal government agencies and then to other buyers, by the War Assets Administration during the week of May 6 through May 11. The tires and tubes were of various sizes and were designed for use on trucks, buses, off-the-road vehicles, and industrial equipment. There were 183,414 tires and 200,312 tubes in the lot.

CPA Adds Personnel

Reactivation of a Component Materials Staff to translate rubber manufacturing production schedules into component requirements, and expansion of the Technical Operations Branch was announced on May 7 by W. James Sears, director of the rubber division of the CPA.

W. R. Lantz, who served in the Rubber Bureau of the WPB in 1945 and who is now on loan from The B. F. Goodrich Co., will head the Component Materials Staff. This group will maintain liaison with other divisions of the CPA and with other government agencies and will work to keep hundreds of component materials flowing to rubber manufacturing plants, it was explained.

Mr. Lantz will be assisted by Harry D. Brown, temporarily detailed to the CPA by the Office of Rubber Reserve. He also served with the WPB Rubber Bureau until V-J Day and is now on leave of absence from the Gates Rubber Co.

Frederick G. Reinke, who worked with government rubber officials while serving as a major in the Army's rubber conservation program, will assist the Technical Operations Branch in planning the reconversion of the rubber manufacturing industry as regards the distribution of natural rubber.

Also in the Technical Operations Branch will be F. P. Hartung, an expert in tire development and in molded and extruded rubber goods, who formerly managed the new products development department of the Ohio Rubber Co. Mr. Hartung also served as plant manager of the Virginia Rubatex Division, Great American Industries, Inc.

Surplus Property News

The War Assets Administration announced on May 6 that a 45-mile natural gas pipeline running from Hutchison County, Tex., to Gray County, Tex., had been offered for sale or lease.

Constructed to supply natural gas to four carbon black plants in the Pampa, Tex., area, the line's present capacity is 148,000,000 cubic feet of gas a day, although an increase of 66,000,000 cubic feet a day is possible. Plants served by this line include three operated by the Cabot Carbon Co. and one operated by the Columbian Carbon Co. The line is offered in its entirety and proposals for partial purchase or lease are not invited, it was said.

A lease held by the Firestone Tire & Rubber Co. on the Jacobs Aircraft plant in Pottstown, Pa., was amended to include all facilities, structures, and installations now on the site, it was announced by the WAA on May 24. The amended lease will run for five years and provide for the usage of additional facilities having a reported cost to the government of $3,555,906.

Industrial Relations News

In contrast to the national picture, relations between management and labor in the rubber industry continued good last month, except for some isolated cases. The disputes that did occur were mostly of minor nature and were settled within a relatively short time.

The Akron plant of The B. F. Goodrich Co. was almost shut down during a walkout of mill and calender room employes which took place from April 24 to 27. These workers together with those on reclaim were dissatisfied with a pay adjustment.

A similar walkout occurred at the Akron plant of the Goodyear Tire & Rubber Co. on April 25 when the company suspended 25 reclaim workers for leaving their jobs too early. The reclaim workers at a meeting of the local union on April 28 voted to return to work, but then decided to wait until the 25 workers returned at the end of their suspension of one week. This action was apparently necessary anyway since operations were bound to be difficult with 25 out of the 115 workers absent.

The General Tire & Rubber Co. in Akron announced on May 3 that it would go on a five-day week immediately to conserve its bead wire supply. The company was reported to have enough wire to continue production on this basis for about two weeks.

After voting during April in favor of a strike, employes of the American Hard Rubber Co. at Butler, N. J., walked out May 6 because of a dispute over wage rates. Main points of the URW local union demands were an 18½¢-an-hour raise retroactive to November 1, 1945, and double time for Sundays and six national holidays. The company's position, as stated by Personnel Manager, K. E. Hunt, was as follows:

"The company offers to increase the average straight time hourly earnings of the employes by more than 18½¢-an-hour above the average straight time hourly earnings for the pay period just before VJ Day. The company has offered to make 15½¢ of this increase retroactive to March 4, 1946, provided it is approved by the National Wage Stabilization Board after acceptance by the union."

The local union at Butler refused to accept this offer although local unions at the American Hard Rubber Plant in Akron and the affiliated plant of the Pequanoc Rubber Co. at Butler have accepted the company offer.

Salary increases for about 1,800 office and plant protection employes of the Goodrich company were announced on May 9. A company statement on this matter said:

"The B. F. Goodrich Co. has filed application for government approval for increases in salary and overtime payment for Akron salaried employees not included within the office and plant protection group represented by local No. 5, URW.

"Local No. 5 has to date refused to sign and approve an application for similar increases of employes in the office and plant protection group.

"The company has decided to put the salary increases into effect for salaried workers in the office and plant protection group as those for salaried personnel not represented by Local No. 5."

The wage offer was not satisfactory to the union office workers, according to George Bass, local No. 5 president, who declared that the union was willing to approve an application if the company makes additional increases amounting to $17 monthly per employe. The union and the company are required by the National Wage Stabilization Board to sign together when an application is filed for approval. The dispute was certified to the NLRB on April 15. The local union took a strike vote on May 9, but the results have not been reported.

A proposed master contract to coordinate negotiations of eight local unions of the Goodrich company at Akron, Los Angeles, Calif., Cadillac, Mich., Oaks, Pa., Clarksville, Tenn., Louisville, Ky., Miami, Okla., and Astoria, N. Y., will be presented to the company as soon as it is approved by members of the various local unions, it was reported on May 18. One main feature of the new proposal asks that no reduction in the regular working force be made because of production curtailment until the working schedule is reduced to six hours a day. The proposal also calls for bargaining on a plant basis because the company has refused to bargain on a corporation-wide basis, it was said. The contract was drawn up several months ago, but revision was necessary after the "Big Four" agreement had been approved.

It was announced on May 21 that a strike vote will be taken by local union No. 9 of the URW at the Akron plant of the General Tire & Rubber Co. The company, according to a union spokesman, has given the local union notification of the cancellation of the present contract and all verbal and signed agreements by virtue of the cancellation clause of the present contract which expires on June 1. Negotiations for a new agreement have been going on for three weeks, with no progress reported. The union has notified the NLRB that a dispute exists between the company and the union. Similar disputes exist at both the Pennsylvania and Texas plants of the General company.

It was reported from Los Angeles late in April that the Thermoid Co. of California had closed its plant because of "exorbitant demands" of the URW. A company statement said that the firm "simply could not stand the higher wage demands made by the union" without incurring losses and that it was distributing final checks to its 250 employes.

On May 22 it was announced that the nine-week old strike of 100 Silvertown sales and service employes of the Goodrich company was settled with an agreement between the company and local No. 5, URW of Akron. The new contract included salary increases plus a liberalized vacation plan, night-shift bonus, double time for Sunday and holiday work, and pay for attending sales conferences. The work week for store employes was reduced from 48 to 44 hours and that of workers in the retreading division from 48 to 40 hours a week.

OPA Revises Rubber Goods Regulations

Amendment 11 to MPR 435—New Bicycle Tires and Tubes—established ceilings for a new-size tire and tube branded Safti-Cycle by The Pharis Tire & Rubber Co., which, however, has notified OPA that it has been unable to secure the necessary molds for this branding and consequently will produce the tire under the name Pharis Motorbike. Amendment 12, therefore, sets maximum prices for the new-name tire and tube at the same level authorized for the Safti-Cycle brand. The amendment, moreover, as OPA has been informed that Dunlop Tire & Rubber Corp. is the lawful owner of all Dunlop brands produced and sold in this country, substitutes the brand owner Dunlop Tire & Rubber Corp. for the brand owner Raleigh Cycle Distributors heretofore listed in the various tables of MPR 435 as the brand owner of the Dunlop tires.

Amendment 10, RMPR 143—Wholesale Prices for New Rubber Tires and Tubes—adds to Table 1 of Appendix I and of Appendix II prices for a 6.00/6.25-16 four-ply tire.

Ceilings have been established for used special-purpose tire tubes, puncture proof with an extra layer of rubber for added protection, declared surplus by the Armed Forces and offered for sale in regular civilian channels. (Order 125 under SO 94—Special Maximum Prices for Certain Used Special-Purpose Pneumatic Tire Tubes—effective May 21). The retail ceilings are now the same as existing ceilings for special-purpose tubes covered by the retail tire regulation. On all sales at retail, each tube must be tagged with the retail ceiling price. On all sales by a government agency or wholesaler, the maximum price is 75% of the retail ceilings.

Order 617, RMPR 136, adjusts maximum prices for sales of tire inflation stands.

Amendment 6 to MPR 528—Tires and Tubes, Recapping and Repairing, and Certain Repair Materials—corrects inadvertent errors of Amendment 5. Thus adjustments are made in discounts for trade-in allowances; a maximum wholesale price level is established for sound basic tire carcasses; and as the maximum wholesale price for basic tire carcass has been lowered, the maximum wholesale price for a recapped tire is reduced to reflect the change in the price of the carcass.

The following orders recently were added to RMPR 528, authorizing maximum prices for the new products indicated: No. 103, one hard rock lug tire, two industrial truck tires, and six logging service tires, all made by The Goodyear Tire & Rubber Co., Inc., Akron, O.; No. 104, two truck tires, Firestone Tire & Rubber Co., Akron; No. 105, new-size Firestone Rock Grip Excavator tire; No. 106, four stop-start, special service truck tires, Dayton Rubber Mfg. Co., Dayton, O.; No. 107, one mud and snow truck tire, one truck tube; No. 108, one industrial pneumatic tire and tube, and one Speedliner pneumatic trailer tire, B. F. Goodrich Co., Akron.

No. 109, one Sure Grip truck tire and two special service front tractor tires, Goodyear; No. 110, two Rock Grip Excavator tires, one all traction logger tire, one Ground Grip type G tire, one swamp buggy tire, Firestone No. 111, one cross and square motorcycle tread tire and tube, one cross and square passenger-car tread tire and tube, six non-skid passenger-car tires and tubes, Firestone; No. 112, one Hard Rock Lug tire and three special-service rear tractor tires, Goodyear.

Amendment 6, RMPR 229—Retail and Wholesale Prices for Rubber Footwear—raises wholesale ceilings for waterproof rubber footwear 10%.

Amendment 7 revises in the order provisions for calculating upward ceilings for waterproof rubber footwear mail-order sales at retail.

Order 17—MPR 200—authorizes maximum prices for certain "Kantmark" no-mark black rubber heels made by Seiberling Rubber Co., Akron, O. Order 18 does likewise for brown and no-mark black men's half heels, known as Goodyear Heelite, made partly of rubber by Goodyear Tire & Rubber Co., Inc., also of Akron.

Amendment 17, MPR 477—Sales of Rubber Heels and Soles in the Shoe Factory and Home Replacement Trades—adds footnote 7 to the end of Appendix C, Table I, indicating that "These prices are for Special Competitive Grade half soles."

Amendment 6 to Supp. Ser. Reg. 47, RMPR 165—Retail Shoe Repair Services—covers charges for attaching to dress or work shoes, Neolite full soles or half soles, manufactured by Goodyear Tire & Rubber Co.; Panolene full soles or half soles, Panther-Panco Rubber Co.; Avonite full soles, Avon Sole Co.; O'Sullivan's men's molded brown and leather-color plastic half soles, O'Sullivan Rubber Co.; Neo-Cord full soles, Gro-Cord Rubber Co.

Region IV Order G-2 under Supp. Ser. Reg. 47, Amendment 2, includes in "Group 'A' Grades, Compo-Dress Half Soles" Neolite brand half soles, Panolene half soles, and O'Sullivan's men's molded brown and leather color plastic half soles.

Exemption from price control of new, reconditioned, and used rubber soles and heels declared surplus by the Armed Forces and offered for sale in regular civilian channels is covered by Order No. 126 under SO 94—Special Exemption of Sales of Rubber Soles and Heels; and Revocation of Orders 102 and 110 under SO 94—Special Maximum Prices for Certain Rubber Heels—all effective May 31. Current production of rubber soles and heels is now about equal to demand; and wherever the surplus heels and soles are sold to consumers, prices are not expected to be above the established ceilings for regular civilian heels and soles.

Amendment 1 to Order 83, MPR 580, establishes maximum retail prices for the following articles made by I. B. Kleinert Rubber Co., 485 Fifth Ave., New York, N. Y.; "Bedtimers" scuffs, "Sportimers" playshoe, and "Kleinert's" dress shields.

Manufacturers have been given an adjustment in their formula for pricing dibutyl phthalate, a chemical used in the production of synthetic rubber, paints, cellophane, textile coatings, adhesives, and other commodities, by Amendment 16 to MPR 37—Butyl Alcohol and Esters Thereof—effective May 22. This action provides that, while ceiling prices for

dibutyl phthalate will continue to vary, depending on the cost of butyl alcohol, a basic ingredient, they will in no case be lower than the seller's March, 1942, prices.

Last month several amendments were added to MPR 82—Wire and Cable. Amendment 4 establishes ceilings for non-metallic sheathed cable, with maximum prices for type R cable up an average of 11% and compensating cuts made in ceilings for type T cable. No. 5 redefines the term "electrical wire or cable"; while the next amendment makes changes in the prices for armored cable. No. 7 grants increases in prices for copper, copper alloy, and copper-clad products and also for services performed in connection with their manufacture.

Order 27, SR 15, establishes ceilings for sales to industrial users of the following special grades of channel carbon black, manufactured at the Schafer Plant of Cabot Carbon Co., 77 Franklin St., Boston, Mass.: Carbolac 1; Black Pearls Nos. 2 and 46; Carbolac Nos. 2 and 46; Super Carbovar; Black Pearls A and 71; Monarch 71 and 74; Mogul; Mogul A; Kalista; Spheron N; Battery Carbon Cabot's 2047; EK 74.

MPR 297—Natural Resins—was revoked May 21 and its products made subject to the Revised Maximum Import Price Regulation.

Amendment 1, Rev. SO 138, among the commodities and services exempted and suspended from price control in Hawaii includes the following: aquatic sporting goods other than apparel and shoes; baseball and basketball equipment; elastic chest pulls, grip developers, medicine balls, football equipment, game calls, golf equipment except apparel and shoes, soccer and softball equipment, and volley ball equipment except apparel and shoes.

Rev. Order 269, MPR 64, establishes maximum prices for sales of the Model 5-C-3 electric range manufactured by the Firestone Tire & Rubber Co., Akron, O.

Order 59, RMPR 86, approves ceilings for the Model 5-Z-14 ironing machine made by Firestone.

Order 462, MPR 591, establishes maximum prices for certain chrome-plated kitchen ledge-type faucets manufactured by the General Tire & Rubber Co., Pasadena, Calif.

Order 168, MPR 478—Coated and Combined Fabrics—rules that sales of coated and combined fabrics may be made on an adjustable pricing basis by manufacturers and converters to purchasers other than resellers. Amendment 13 grants converters an increase of about 7% in ceilings.

Manufacturers' ceilings for fabrics coated with rubber, pyroxylin, or oil, except coated window-shade cloth, have been increased approximately 13½% by Amendment 14 to MPR 478—Coated and Combined Fabrics—effective May 24. This increase has been granted to take care of higher labor and material costs incurred since October, 1945, date of a previous price adjustment. The products given higher ceilings are sold generally to manufacturers of upholstered items, shower curtains, sanitary items, and various other commodities utilizing coated fabrics. The users of this cloth who have formula ceilings based on current costs will be able to pass the price increases on. OPA said that price relief for manufacturers of coated window-shade cloth is still under consideration.

War Assets Administration, Washington, D. C., is offering for sale another wartime invention, a non-skid aircraft tire designed for use on Noorduyn Norsemen C-64's in operations from northern ice and snow covered fields. Known as the "beer cap" tire because small steel disks about the size of beer caps have been inserted in the tread to give it anti-skid properties, it is an eight-ply, 30-inch standard size, smooth contour aircraft tire. It is comparable in size to the 7.00 x 15 commercial auto and truck tire.

OBITUARY

George S. Hayes

GEORGE SHAPLEIGH HAYES, director and purchasing agent of The Okonite Co., Passaic, N. J., died May 3 at the Community Hospital, Montclair, N. J., following a two-week seige of pneumonia.

Born in Somersworth, N. H., June 5, 1864, he received his education at the Glens Falls (N. Y.) Academy. He first entered business in Boston, later moving to Denver, where he was in the real estate, contracting, and construction field. After several years the deceased went to Nebraska and became a partner in a group of grain elevator firms at Hastings and Lincoln. In 1908 he returned East and operated one of the earliest taxi companies.

Then in 1911 he joined The Okonite Co., undertaking the purchase and operation of its rubber plantation in British Guiana. In 1918, when the plantation was sold, Mr. Hayes returned to the United States and assumed the duties of purchasing agent for the company. He was also elected a director in 1923 and continued to serve in these capacities until his death. Besides he was purchasing agent for The Okonite-Collender Cable Co., Inc., Paterson, N. J., and the Hazard Insulated Wire Works division of The Okonite Co., Wilkes-Barre, Pa.

Mr. Hayes was a member of the Pennington Club of Passaic and the Masons.

Funeral services were held at the Watchung Congregational Church, Montclair, on May 5; and burial took place in Denver, Colo.

He leaves a wife, a son, a daughter, and two grandchildren.

Raymond Sheldon Crawford

RAYMOND SHELDON CRAWFORD, manager of the Rubber Heel & Sole Trade Association, 551 Fifth Ave., N. Y., died of a heart attack April 23 on a train while enroute to his home in Bronxville, N. Y. As manager of the Association for the past 15 years he represented the manufacturers in their contacts with Washington.

Born in Iowa, May 7, 1880, Mr. Crawford was at one time a vice president of The Victor Products Corp., Hagerstown, Md. He had also formerly been associated with Acme Paint & Varnish Co., Congoleum Co., Certain-Teed Products Corp., and Roofing Manufacturers' Association.

Mr. Crawford belonged to the Bronxville Field and the Westchester Country clubs, and was an elder of the Reformed Church of Bronxville, N. Y.

Funeral services were held on April 25 at the Reformed Church, with interment at Ferncliff Mausoleum.

He leaves a wife, a son, two sisters, and a brother.

Gustave Kush

GUSTAVE KUSH, retired rubber expert and inventor, died May 10 at his home in Montclair, N. J., after a long illness. Funeral services took place May 11, and burial followed at Mt. Pleasant Cemetery.

Born in Germany, December 27, 1857, Mr. Kush first made connections in the rubber industry with the Revere Rubber Co. and the United States Rubber Co., as independent research chemist and inventor. He was called upon by the United States Government during World War I for advice in the rubber crisis; he also had served in the Navy during the Spanish-American War. In the 1870's he had worked on Panama Canal construction.

He was at one time a member of the Hardware Club.

Three daughters survive.

Howard W. Starkweather

HOWARD W. STARKWEATHER, since 1934 a member of the executive staff of the Jackson Laboratory of the organic chemicals department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., died suddenly of a heart attack on May 18.

Born in Carbondale, Pa., on September 25, 1890, Dr. Starkweather was graduated from Bucknell University in 1911. After spending three years as an instructor at Phillips Exeter Academy, Exeter, N. H., he returned to Bucknell to take his master of science degree in 1915. Harvard University granted him the degree of master of arts the same year and in 1925, the degree of doctor of philosophy.

The deceased was assistant professor of chemistry at Hobart College from 1916 to 1918, leaving his post there to enter the Jackson Laboratory. After three years, however, he became an instructor at Brown University for two years. He was a fellow at Harvard in 1924 and 1925 and did research work there under the Milton Fund between 1925 and 1929, when he joined the staff of the Du Pont Experimental Station. He was transferred to the Jackson Laboratory in 1934 and became head of the polymerization division in 1935. He made many contributions to the scientific literature and held numerous patents.

A member of Alpha Chi Sigma, Dr. Starkweather was also active in the Wilmington Section of the American Chemical Society. He served as councillor for three terms.

He is survived by his wife, a son, and a daughter.

EASTERN AND SOUTHERN

Posts for Research Personnel

Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J., has announced the establishment of positions designed to give due recognition to the professional accomplishments of its research personnel and to afford the widest opportunity for their scientific services.

The first phase of this program was instituted in January, 1944, by establishment of the position of research associate to recognize high scientific attainments and wide experience in both the prosecution and direction of the research of the company. Research associates are relieved of the responsibilities for detailed administration of a regular unit of research in order to be available for important special assignments in the research department. They must have had not less than 20 years of professional experience since receiving a Ph.D. or its equivalent and must have been in the employ of the company not less than ten years, five of which were spent in directing or supervising the research work of others. The position is comparable with an executive position in research requiring similar experience and entailing equivalent responsibilities.

A second phase of Calco's program is now completed by establishment of the position of research fellow to recognize outstanding ability for individual research. The position affords the opportunity for properly qualified scientific personnel to concentrate on research without the handicaps imposed by supervisory responsibilities. Research fellows must have had not less than ten years of professional experience since receiving a Ph.D. or 15 years of professional experience since obtaining the Bachelors' degree, and must have completed five years of continuous service in research with the company. The position is comparable with a supervisory position in research requiring similar experience and attainments.

The appointment of Robert P. Parker as assistant to the research director at Calco has been announced by M. L. Crossley, research director. Dr. Parker received his doctorate from Yale University in 1933 and has been associated with Calco since that time. For the past two years he was assistant director of the organic section of the research department.

Dr. Crossley also announced the appointment of Dale R. Eberhart as research fellow. Dr. Eberhart earned his Ph.D. at Ohio State University in 1935 and has been with Calco ever since.

R. N. Griswold has been appointed branch manager of the pigment department, Cincinnati office, 608 First National Bank Bldg., Cincinnati 2, O., according to Leo Sklarz, sales manager of Calco's pigment department. Mr. Griswold joined Calco in 1937. He is a graduate of the University of Wisconsin, Class of '33, with a B.S. in chemical engineering.

Sharples Chemicals, Inc., Philadelphia, Pa., has moved its New York, N. Y., sales offices to larger quarters in the Empire State Bldg., Room 8211, 350 Fifth Ave.

Expanding Lumite Division

The Lumite division, Chicopee Mfg. Corp., New York, N. Y., has announced that its new plant is rapidly nearing completion near Cornelia, Ga. W. J. Holman, Jr., company vice president and general manager of the division, has stated that the new plant will probably be in full operation by midsummer. Occupying a 330-acre site, the plant will be one of the most modern textile mills in the South. It will utilize conventional textile-mill equipment such as looms, but will contain a number of innovations, including use of infra-red rays for heating calender rolls. Entirely a single-story structure, the new plant is designed for an unbroken flow of materials from the receiving platform through the various mill departments to the shipping platform. Provision has been made for possible future expansion in size of the building. The new plant will provide Lumite insect screen cloth for doors and windows of homes and industrial plants where strength, easy cleansing, rust resistance, and absence of staining beneath window sills are important.

Plans for setting up a country-wide distribution plan for Lumite screening were also announced by the company. At present, supplies of the screen cloth are being stocked in strategic areas where the rush of home-building promises to be greatest. A wholesale organization is being built up to meet replacement as well as new construction needs. The screen cloth is now being produced in only one color, dark green, selected because surveys showed it to have top preference among home and industrial users. This color is permanent for the life of the screen and is entirely resistant to fading or discoloration.

Lumite automobile seat covers are now being distributed on a commercial scale to wholesalers and retail outlets throughout the country, and this distribution will be expanded as soon as production permits. Available in a wide range of solid colors and two-tone combinations, the covering can be supplied in many designs, such as the standard plaid of other seat-cover materials. In addition to possessing the resistant characteristics of Lumite screen cloth, inherent in the use of Saran filaments, the seat covers are porous and permit better ventilation than conventional coverings.

The Glenn L. Martin Co., Baltimore, Md., has appointed Harold M. Parsekian, formerly of Binney & Smith Co., New York, N. Y., director of sales and technical service of Martin's plastics and chemicals division, to be in charge of the sale of the company's new Marvinol polyvinyl resins and other related products.

The Pennsylvania Rubber Co., Jeannette, Pa., has appointed F. E. Nagle sales representative in Southern California and Arizona. Mr. Nagle has had many years of experience in the tire field, having served as manager of bus and truck tire departments in the Omaha and Milwaukee branches of The B. F. Goodrich Co.

The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., announced the election of Albert K. Dannenbaum, president, Aldan Rubber Co., Philadelphia, Pa., as chairman of the RMA coated materials division at the organization's annual meeting in New York on May 14. He succeeds Howard M. Sawyer, president of H. M. Sawyer & Son Co., Cambridge, Mass., who was extended a vote of thanks for two years of outstanding service as head of the division.

At the same time three member companies were elected to representation on the divisional executive committee for terms of three years: E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; the Sawyer Co.; and Vulcan Proofing Co., Brooklyn, N. Y. John P. Hach, assistant secretary of the RMA, was appointed executive committee secretary.

Factors influencing present production of textiles were discussed by De Forest Anthony, Chief of CPA Cotton and Synthetic Textiles Branch.

American Society for Testing Materials has moved from 260 S. Broad St. to 1916 Race St., Philadelphia 3, Pa.

Miss Kate Zorn, who started with A. Schrader's Son in Brooklyn, N. Y., in 1895, recently was honored by her fellow workers at a dinner celebrating her 50 years with the company. John Effers, her first boss at Schrader's, presented her with a check for $2,500 from the company, which is now a division of The Scovill Mfg. Co., and a Scovill pin with three diamonds commemorating her 50 years' serice. At Miss Zorn's table among other veteran employes was W. T. Hunter, vice president in charge of The Schrader division, who has been with the organization 47 years.

Simpson's Miracle Products, Inc., New York, N. Y., recently presented several new developments of interest to the shoe industry at a special exhibit of the Shoe Manufacturers' Fall Opening at the Hotel New Yorker. The exhibit featured shoe soles made from a soybean material, which closely resemble leather, although lighter in weight. According to Elliot E. Simpson, over 60 million pairs of shoes have been made using the soybean-base soles which have outworn leather soles by three to one. The soles can be made in many colors, including multi-color effects, and are said to be waterproof, washable, and flexible. The material is thermoplastic, softening at about 300° F. Other developments shown included rubber crepe soles, available in various colors and crepe surfaces and made from a blend of synthetic rubbers, and Walk-On-Air soles for women's platform shoes, consisting of an integral soybean material sole and compressed rubber sponge platform, eliminating the need of present wood or other bind material and providing a flexible platform. Developments for the shoe repair industry included shoe sole patches of the soybean material which can be applied by means of a branding iron; a shoe repair machine for rapid application of soybean material soles; and a Wizard shoe patching soybean-base putty for ready repair of worn spots in leather or rubber shoe soles and heels.

St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y., last month made several changes in its executive department. Elected to the newly created post of executive vice president was Andrew Fletcher, formerly a vice president and treasurer. Francis Cameron, in charge of the company's mining operations, becomes a vice president, and George I. Brigden, treasurer; while Robert Bennett, assistant secretary-treasurer, has been moved up to succeed Mr. Brigden as secretary. Charles Fleig, assistant secretary, and James G. Colvin, assistant comptroller, both have been given the offices of assistant treasurer and assistant secretary.

St. Joseph Lead on May 9 also announced the appointment of Charles R. Ince as manager of metal sales and of Dwight Marshall as assistant manager and the return of Lt. Malcolm Bonynge, U.S.N.R., as assistant manager.

International Plastic Corp., Morristown, N. J., manufacturer of Filmonize and Taypit self-sealing tapes, has announced that Jan Teppema has joined its staff as director of laboratory operations. Since 1943, Dr. Teppema had been chief chemist of the B. B. Chemical Co., where his work was devoted to applications of adhesives in war industries. Educated at Amsterdam and Leyden Universities in Holland, where he received his Ph.D. in chemistry, Dr. Teppema operated his own chemical manufacturing firm, the Tip-ter Chemical Co., before becoming associated with the Goodyear Tire & Rubber Co.

Martin Rubber Co., Long Branch, N. J., according to President Walter L. Tepper is expanding. Work has already been started on a large shipping department, and the company plans soon to construct a modern testing laboratory. Martin Rubber Co. moved to Long Branch in 1936 when it was making dental supplies, and the plant grew steadily until today it manufactures plumbing and hardware items, household goods, and medical and dental supplies. During the war, however, more than 80% of its products went to the Armed Services; now, however, the figure has dropped to about 10%. The company at present employs 150 workers in three shifts, but Mr. Tepper expects the number to reach 300 soon.

The Flintkote Co., New York, N. Y., has announced the addition of a new product to its line of industrial coatings. Known as Flintred, it is a synthetic plastic anti-slip coating which is applied by trowel over steel, concrete, aluminum, galvanized iron, hard tile, and wood floors. On clean steel it serves as a corrosion resistant protective coating in addition to its anti-slip function. Flintred will be available in red, green, and slate blue, ready for application in trowel coats of approximately 1/16- to 1/8-inch thickness. Resistant to water, gasoline, oil, alcohol, ordinary fats, and grease, the material is expected to find many industrial uses, particularly for periodical application to worn floor areas that become slippery and unsafe when wet from water, oil, or the like. The company has issued a data sheet giving methods of applications and uses for the material.

Bennett with United Carbon

United Carbon Co., Inc., Charleston, W. Va., has announced that Myron T. Bennett has been appointed vice president in charge of sales, with offices at Charleston. Mr. Bennett, formerly manager of pigment sales for the New Jersey Zinc Co. at New York, assumed his new position March 1. The new vice president of United Carbon was graduated from Knox College, in 1923 and was connected with James H. Rhodes Co., Chicago, Ill., until 1926, when he joined N. J. Zinc in Chicago. In 1939, Mr. Bennett came to New York as assistant manager of pigment sales for N. J. Zinc and in 1942 was made manager of that department, a position he held until joining United Carbon.

W. W. "Bill" Higgins, eastern district sales manager for United Carbon, who is this year rounding out 44 years in the carbon black business, has been made general sales consultant for United Carbon and will still maintain an office in the Empire State Bldg. in New York. Mr. Higgins has been with the company since 1929.

W. S. Rae will be in charge of sales for United Carbon in the eastern district, which comprises New York, New Jersey, Pennsylvania, Delaware, and Maryland, with offices also in the Empire State Bldg.

Du Pont Executive Changes

The retirement of Jasper E. Crane as a vice president and member of the executive committee of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., effective May 31, and the election of Crawford H. Greenewalt, assistant general manager of the company's pigments department, to succeed him were announced May 20 following a meeting of the board of directors. Also reported were the retirement of James B. Eliason as a vice president and treasurer of the company, effective immediately, and the election of Walter J. Beadle, first assistant treasurer, as his successor. Mr. Crane and Mr. Eliason will continue as directors, and Mr. Eliason will also retain his membership on the finance committee. Mr. Beadle was also elected a member of the board. It was voted at the meeting to increase the number of directors from 35 to 36.

Mr. Crane, a graduate of Princeton University in the Class of 1901, joined the Arlington Co., one of the earliest American manufacturers of plastics, in the same year. In 1903-04, on leave of absence, he was a special student in chemistry at the Massachusetts Institute of Technology. He came to the du Pont company when it acquired Arlington Co. in 1915. He served as head of the cellulose division of the chemical department through the First World War and was then assigned to London as the company's European manager. In 1926 he was recalled to manage a new du Pont subsidiary, Lazote, Inc., formed to produce synthetic ammonia in the United States. In 1927, Mr. Crane was elected a director of the du Pont company and in 1929 he was named a vice president and to the executive committee. In the latter capacity he has served as adviser on the company's foreign relations.

Mr. Eliason attended Goldey Commercial College in Wilmington and came to du Pont in 1903 as a clerk in the Repauno Chemical Co. A transfer put him in du Pont's accounting department. He entered the treasurer's department in 1908, was made treasurer of the company in 1930, a vice president and member of the board in 1940, and a member of the finance committee in 1944.

Dr. Greenewalt started with the company as a chemist in the Philadelphia Works following his graduation from M.I.T. in 1922. In 1924 he was transferred to the experimental station of the chemical department in Wilmington. He was made a group leader of research chemists in 1927, a research supervisor in charge of a number of groups in 1933, and assistant director of the station in 1939. Through this period he played an important part in the development of nylon. In January, 1942, Dr. Greenewalt was elected a director of the company and in June of the same year became chemical director of the Grasselli chemicals department. Next, he became technical director of the explosives department, assigned to special war work. Then in March, 1945, he was made an assistant director of the development department and the following August was appointed assistant general manager of the pigments department.

Mr. Beadle was graduated from M.I.T. in 1917. He came to du Pont in 1928 as a technical investigator for the development department and a year later was made assistant director of that department. In 1942 he was named an assistant treasurer of the company and in 1943 first assistant treasurer.

T. C. Davis succeeds Mr. Beadle as first assistant treasurer. Mr. Davis was graduated from Bowmans College in 1918. He was employed by du Pont as manager of the tax division of the accounting department in 1934, became assistant comptroller in 1941, and an assistant treasurer in 1944.

Blaw-Knox Co., Pittsburgh, Pa., has taken over from the J. O. Ross Engineering Corp., New York, N. Y., all engineering, sales, fabricating, and installation of the Ross Superthermm hot water heating system in North and South America.

Acme Rubber Mfg. Co., Trenton, N. J., has appointed L. J. Amsdell sales manager of western territory, with headquarters at 546 W. Washington Blvd., Chicago, Ill. Mr. Amsdell formerly was with the Goodyear Tire & Rubber Co., Akron.

N. S. W. Vanderhoef, vice president and treasurer of Turney Halsey Export Co., New York, N. Y., has been elected president of the Textile Export Association of the United States.

Columbian Carbon Co., New York, N. Y., held its annual meeting of shareholders April 30 at which President Reed L. Carr reported that he did not expect the company to complete its $7,000,000 capital expenditures in 1946 because of restrictions on material. He further revealed that, based on first-quarter results, sales this year are running at an annual rate of $32,000,000, contrasted with $27,000,000 last year.

Changes Name; Hewitt Expanding

Hewitt Rubber Corp., Buffalo, N. Y., has changed its name to Hewitt-Robins, Inc., thereby bringing in the identity of its wholly owned subsidiary, Robins Conveyors, Inc. This change was announced by Thomas Robins, Jr., president, after it had been approved by the stockholders in Buffalo on April 30, when all officers also were reelected. Besides Harold H. Von Thaden, first vice president of Robins Conveyors, was elected a director of Hewitt-Robins, Inc.

The manufacture of foam rubber, molded rubber goods, conveyer belts, transmission belts, and industrial hose in the company's Buffalo plants will continue as the Hewitt Rubber Division of the corporation. The engineering and manufacturing conveyers and other materials handling systems at Passaic, N. J., will be known as the Robins Conveyors Division. Production operations of the two divisions are not affected by the change, but some field offices are being consolidated for greater efficiency.

Mr. Robins also said that both divisions of the company continue to produce at record high levels, and he announced plans for building an addition to the plant in Passaic.

Hewitt has started also work on a new brick building to house the expanded molded goods department at the main Buffalo plant. Frank Blanchard, factory manager, said the new structure will be 100 by 160 feet and will form a continuation of a modern one-story building put up in 1941. The necessary fabricated steel parts, ordered several months ago, are now completed.

On the site of the new construction was an old frame building erected in 1916 as a temporary manufacturing building for the Metric Packing Co., maker of rubber and fabric packings for valves and pumps. This company subsequently became a part of Hewitt Rubber Corp. Early in the war the production of packings was discontinued, and the space converted to the production of aircraft bullet-sealing fuel tanks. The old frame structure was razed in April.

Before the war Hewitt manufactured limited quantities of molded rubber items, and this type of manufacturing increased as the company became a leading producer of bullet-sealing airplane fuel cells. Among the peacetime molded items will be a wide line of engineered rubber products for farm machinery and for the oil, food, mining, and other essential industries. Many of these products will require extensive research and engineering development.

Hewitt further announced that several contracts for the new Restfoam material already are in production, headed by a sizable order for foam rubber automobile seat cushions. According to Adrian W. Smith, manager of the Restfoam division, the cushioning material is being shipped to a major automobile manufacturer in Detroit and is being used in one of the top-price cars. Among other Hewitt foam rubber orders in production are office chair seats of a popular type; bar stool tops; railroad car seats; bus seats; back, seat, and arm rests for executive chairs; hospital mattresses; reversible furniture cushions for the trade; and utility foam rubber slabs. The utility stock, used in furniture and upholstery, is produced in various densities, and in thicknesses ranging from ½-inch to 2½ inches. Some slabs are cored, and others are solid. Mr. Smith stated that Hewitt's present output is very small in comparison with the projected schedule and that production will be expanded several times by the installation of new equipment now being received from suppliers.

Hewitt Rubber has appointed Andrew Thompson manager of transportation seating, Restfoam division. In his new position Mr. Thompson will direct sales of foam rubber used in railroad cars, buses, air lines, and other forms of commercial travel. He has been with the company since 1936, having served in the sales department at Buffalo and as manager of New England sales. He was discharged from the United States Army recently.

South Asia Corp., importer of crude rubber, 80 Broad St., New York 4, N. Y., has elected E. P. Lambert vice president and a director.

Harry Burrell and **C. P. Neidig** have formed Burrell & Neidig, an industrial chemical consulting firm with offices at 115 Broadway, New York, N. Y., which plans to consult on formaldehyde and its uses, plastics and their raw materials, protective coatings, sales development work on new products, research administration, and market surveys for the chemical and allied fields. Mr. Burrell was formerly director of research of the Heyden Chemical Corp. laboratories, and Mr. Neidig was in charge of the market research and technical service group for the company.

Pittsburgh Corning Corp., Pittsburgh, Pa., on May 14 announced plans to build two plants at Sedalia, Mo., for the production of glass block and Foamglas, a cellular glass insulating material. Estimated cost of the expansion program is $2,000,000, according to J. P. Staples, general manager of the concern.

Industrial Marketers of New Jersey, at a meeting May 15 at Essex House, Newark, N. J., elected as president Ralph Hanes, sales promotion manager of the mechanical goods and wire and cable divisions of United States Rubber Co. Among other officers elected were: Edwin Perrin, of Robins Conveyors, Inc., a vice president; and Edward J. Pechin, E. I. du Pont de Nemours & Co., Inc., and Richard S. Hayes, Okonite Co., directors.

General Electric Co., Schenectady, N. Y., has named to the newly created post of assistant manager of its plastics divisions at Pittsfield, Mass., George P. Lehmann, according to William H. Milton, Jr., manager of all G-E plastics operations. A former colonel in the 12th Air Force Service Command, Mr. Lehmann has been staff assistant to the manager of the plastics divisions since his return last fall after 4½ years in service and previously had been assistant to the chief engineer of the Plastics divisions and before that plant engineer at the company's Meriden, Conn., plant. Mr. Lehmann had joined General Electric in 1935 as a student engineer and was associated with the company's high-voltage laboratory in Pittsfield before transferring to the plastics divisions.

Changes in U. S. Personnel

Last month the United States Rubber Co., Rockefeller Center, New York 20, N. Y., announced the following changes in its organization.

Harry E. Cooper has been appointed manager of the Lastex yarn and rubber thread division of the rubber company, succeeding Harlow W. Waite, who is retiring after 42 years with the company. Mr. Cooper was a superintendent of the company's plant in Providence, R. I., with supervision over the production of rubber thread, Lastex yarn, Laton yarn, Lyntron cut thread, and other products. A native of New Jersey and graduate of Yale University, Mr. Cooper has been associated with the company since 1920 as an engineer and production supervisor. He spent several years in the Far Eastern rubber plantation as production engineer.

Mr. Waite began his career in the company's Passaic, N. J., plant. He has been manager of Lastex and rubber thread since 1932.

Percy Adamson will continue as selling agent of Lastex and Laton yarns produced by the division.

Cliff G. Currie has been assigned a new position as sales engineer for the U. S. Tires division at the general offices of U. S. Rubber in New York, according to W. D. Baldwin, sales manager for U. S. Tires, who also announced five new district appointments. New district managers are Harry J. Noznesky, Pittsburgh district; Karl N. Carter, Memphis; Edward W. Otto, Salt Lake City; and Frederick C. Tucker, San Antonio. Walter L. Clarkson has been made assistant district manager of the Philadelphia district.

Mr. Currie has been with the company since 1933, when he began work at the Detroit plant in a supervisory capacity in the testing and development department. After serving as supervisor of test fleet development, he became a field sales representative in 1937, acting successively in Atlanta, Ga., Jacksonville, Fla., and Charlotte, N. C. During the war he was a project engineer in the company's fuel cell division and also an engineer in the tire engineering and service department.

Mr. Noznesky served in a sales capacity from 1935 to 1941, when he was transferred to the export department at Chicopee Falls, Mass. His wartime positions included supervision of sales activities for fuel cells and special duties in connection with airplane tire sales.

In the tire business for 12 years, Mr. Carter first worked for U. S. Rubber in a sales capacity at Cincinnati in 1940 and two years later was moved to New York as a special representative in the war products division. Transferred to the tires division last year, he was installed as branch manager at San Antonio, Tex., when a U. S. branch was opened there.

Mr. Otto, a veteran of 28 years with U. S. Rubber, first worked as a payroll clerk, then as special representative and salesman of Royal tires and mechanical goods. He became a division manager at Kansas City in 1938. Later he handled the sale of truck and bus tires and recently became U. S. fleet sales representative working out of Kansas City.

With the rubber company since 1939, Mr. Tucker had been a Fisk branch operating adjustor at Chicopee Falls, and served in the tire engineering and service department at Houston and Dallas

Tex. From 1942 to 1945 he served in the Ordnance Department as a major, specializing in rubber conservation and reclamation. During the past few months he has been a fleet sales representative in Atlanta.

Mr. Clarkson's first duties with the company in 1937 were as special oil-company representative, following several years with petroleum companies. Subsequent general office positions included manager of oil-company sales and manager of camelback and repair materials.

Olen D. Brazil has been appointed district manager of U.S. Tires sales in the Charlotte, N. C., district, and Horace E. Walker has been named district manager at New Orleans, La. Mr. Brazil, who succeeds W. O. Boone, who resigned to enter business for himself, became affiliated with the rubber company in 1944 as a salesman and subsequently served as assistant district manager of U.S. Tires sales at Atlanta, Ga., and district manager at New Orleans.

Mr. Walker's 18 years' experience in the tire and rubber business includes operation of his own tire sales establishment in Jacksonville, Fla., and sales positions with various tire companies. Affiliated with U. S. Rubber since 1941, he served as salesman in the Chicago and Charlotte districts and more recently as special car dealer representative in the southern division with headquarters in Atlanta.

To provide more efficient tire distribution in the Pacific Northwest, the U.S. Tires division has established a northwest division with headquarters at Portland, Ore. Announcement of the change was made by W. D. Baldwin, U.S. Tires sales manager, who also revealed the appointment of Chester W. Ort as northwest division manager, Dwight B. Eldred as central division manager, and Lawrence J. Goodman to succeed Mr. Eldred as manager of wholesale merchandising at the general offices in New York. The new division will supervise distribution and sales in branch offices at Portland, Salt Lake City, Seattle, and Spokane.

The western division will continue under the supervision of W. H. Kneass, divisional manager, located at the company's Los Angeles plant. Branches of the division will include Los Angeles, San Francisco, Denver, Dallas, and San Antonio.

Mr. Ort joined U. S. Rubber in 1913 as a salesman in the Seattle branch and later served successively as branch manager for the footwear division in Salt Lake City and Spokane, as district manager for U.S. Tires at Los Angeles, Minneapolis, and Kansas City, and as division manager at San Francisco and Memphis. In 1941 he was transferred to the Detroit plant to assist in organizing the war products section of the automotive division. He returned to the tires division in 1942 as central division manager at Chicago.

Mr. Eldred came to the company in 1941 as a supervisor of oil company sales and was promoted to manager of the petroleum sales department in 1944. He later became manager, wholesale merchandising department.

Mr. Goodman spent a number of years in the transportation and tire business before joining U. S. Rubber in 1943 as a salesman in the Pittsburgh district. In 1945 he was made sales training representative, with headquarters at New York.

The U. S. Tire Distributer Advisory Council at its first session for 1946, held recently at the Drake Hotel in Chicago, Ill., elected Robert B. Nelson, of Standard Service Tire Co., Seattle, Wash., as chairman for the coming year. At this session a preview of the U. S. advertising and service merchandising program was given by representatives of the U.S. Tires division of U. S. Rubber. Details of the program were explained by W. D. Baldwin, sales manager, assisted by J. G. Schaefer, manager of advertising and sales promotion, and A. B. Fennell, trade sales manager.

Walter C. Burns has been appointed district sales manager of the mechanical goods division of U. S. Rubber in San Francisco, with supervision over mechanical goods sales in northern California and most of Nevada. A native of Alaska and a graduate of the University of California, Mr. Burns returned recently to the rubber company after four years in the Armed Forces. Before the war he was a mechanical goods salesman in San Francisco.

Charles H. Tarut has been made district sales manager of the mechanical goods division, New Orleans district. He has served the company for 28 years as clerk, salesman, assistant to district sales manager, and in special assignments.

To provide more intensive sales coverage of New England, a Fisk branch sales office was opened at 560 Atlantic Ave., Boston, with A. C. Todd, formerly Fisk merchandising representative at Boston, district manager for the new branch. Mr. Todd has been in the tire and transportation business 28 years. This new branch will serve the entire states of Maine, New Hampshire, Vermont, Massachusetts, and Rhode Island and all of Connecticut except Fairfield County.

For the third consecutive year J. Chester Ray, sales manager of the Fisk tire division, has been elected president of the New York Sales Managers' Club. It was the first time a member had been voted a third term as club president.

Peacetime Products Returning

Rubber bathing caps are back in production for the first time since the beginning of the war, the company announced last month, but not enough caps will be available for everybody until 1947. It is expected that there will be sufficient production to meet about 50% of this year's demand, and output will be increased when additional materials and manpower become available. The caps, white in color, come in various surface designs. One model, the U. S. Howland cap, is made with suction cups and newly perfected reenforced ribs to produce a snug fit which keeps the water out.

Lastex yarn, widely used in the manufacture of form-fitting swimsuits, is also returning in limited quantities. Supply will not catch up with demand until next year, the company reported.

U. S. Royalene, a pliable, tough, and washable vinyl-type plastic sheeting, is now being produced by U. S. Rubber for use in ladies' handbags, purses, and belts, and in men's billfolds, tobacco pouches, and brief cases. Other uses for the new material are for instrument case covers, luggage trimming, golf bags, automotive seat covers, shoes, and for many novelties. The sheeting is said not to harden or crack with age or severe use. It is pliable and can be easily tailored into wrinkle-free finished products. It is scuff-proof and has high resistance to snagging, tearing, or puncturing. Not affected by alcohol, perspiration, oil, grease, mildew, and most acids, it has high stain resistance. The sheeting, made without fabric backing or surface finishing coat, is being produced in a range of colors from light to dark tones and in several gages and pliabilities, depending on the end-product requirements. Royalene can be embossed, made smooth, or press polished to give a high mirror-like gloss.

The Mimex Co., manufacturer of sealing compounds for cans, drums, pails, and metal closures, and of adhesives and rubber compounds, has moved its offices, laboratory, and plant to 37th St. and 12th Ave., Brooklyn 18, N. Y., where greatly enlarged facilities are available.

Carl M. Loeb, Rhoades & Co., 61 Broadway, New York 6, N. Y., has announced that Frederick T. Koyle, until recently general manager of the Rubber Trade Association of New York, Inc., has rejoined the Loeb organization as manager of its rubber department.

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Pharis Tire & Rubber Co., Newark, through Ralph Reel, vice president in charge of research, states that synthetic tire tubes now in production are so superior in air retention and all desired qualities that natural rubber tubes have virtually no chance to make a comeback. Both neoprene and Butyl tubes are tear resistant and can be easily cold patched. Of the two synthetics, neoprene behaves more nearly like natural rubber in processing than Butyl, as substantiated by the Baruch Report, Mr. Reel said. Neoprene also has shown marked superiority in resilience and slow heat build-up during experimental tests. Although it appears that we must rely upon natural rubber to a certain extent for building tires, particularly truck tires, in the immediate future, synthetic rubber will certainly not be sold short, Mr. Reel declared, and will have a far greater potential future than natural rubber because of its ability to be tailor-made. Mr. Reel expressed the opinion that we may find synthetic rubber playing a far greater role in tire making a decade from now than is anticipated at present.

Battelle Memorial Institute, Columbus, has announced that Frederick E. Clark has joined its technical staff and will engage in research in organic chemistry. Until recently associated with the United States Department of Agriculture, Bureau of Agricultural Industrial Chemistry, Salinas, Calif., Mr. Clark holds B.S. and M.S. degrees in chemistry from the University of New Hampshire. He is a member of the American Chemical Society and of its Division of Rubber Chemistry.

Brewer Heads Master Tire

At the recent annual meeting of stockholders of Master Tire & Rubber Corp., Findlay, the following directors were re-elected: W. B. Brewer, M. S. Fetter, C. E. Hart, John F. Schaefer, John Twomey, C. P. Weaver, and F. M. Wiseley; and the following new directors were added: Fred G. McLaughlin and Harry J. Nichols. Then the directors named to the newly created post of chairman of the board Mr. Schaefer, who had been Master president for the past eight years. Mr. Brewer, executive vice president since 1944, was elected president, and the following officers were reelected: Mr. Hart, secretary; Mr. Weaver, vice president in charge of sales; and Mr. Fetter, treasurer.

As chairman of the board, Mr. Schaefer expects to remain active in the affairs of the corporation, of which he was one of the founders when it began in 1914 in Akron as the M & M Repair Kit. Since, however, production facilities and sales outlets for Master Tire have increased during the past few years, executive responsibilities have become heavier.

In his annual report to stockholders the retiring president said that although termination of hostilities last year led to cancellation of war contracts, the company converted rapidly to peacetime products so that by the end of the year it had practically regained the sales volume lost because of the war contracts canceled. The expansion program begun during 1945 was almost complete, but, Mr. Schaefer explained, some critical equipment is still undelivered owing to delays on the part of suppliers. Mr. Schaefer added that while present production and sales volume exceed any previous figure, further increases will be gained when all the new equipment finally is received.

Mr. Brewer began his career in the rubber industry as a stockboy for the Toledo Ford Tire Co. in 1916. The next year, however, he went to the Giant Tire & Rubber Co., serving successively as shipping clerk, department foreman, and, in 1920, plant superintendent. He continued as such for ten years until the Giant Tire operations were merged with The Cooper Corp. and The Falls Rubber Co., both of Findlay. Mr. Brewer acted in various capacities in the consolidated companies and took over supervision of manufacturing in 1934. Then he was elected to the board of directors of the parent organization, Master Tire & Rubber Corp., on November 1, 1937, and was made vice president in charge of manufacturing. He was named executive vice president in December, 1944. Mr. Brewer also was an organizer of the Central Rubber Reclaiming Co. in 1934 and served as a vice president, but resigned in 1939 to devote all his energies to the Master Tire & Rubber Corp.

Seiberling Rubber Co., Akron, has announced that George Weisenbach, with the United States Navy since August 12, 1944, on May 15 resumed his former post as Seiberling advertising manager. Acting Advertising Manager Earle Cook becomes assistant advertising manager.

Lee T. Rosser is the new district manager of Seiberling's San Francisco, Calif., branch.

Develops "White Carbon Black"

Discovery of a powdery, fumed silica material which acts as a "white carbon black" in rubber compounding was announced by Howard E. Fritz, vice president-research for The B. F. Goodrich Co., Akron. Chemically, the new material, which has the appearance of a white soot, is ordinary silica and is produced by the combustion of ethyl silicate. Electron microscope examination of the superfine, white, partly translucent powder shows its particles to have the same size and shape as those of carbon black. Compounded in rubber, it increases tear resistance, abrasion resistance, and tensile strength without affecting the rubber's color or translucency. Use of carbon black for necessary reenforcement of rubber properties, especially needed in synthetic rubbers, has prevented the use of colors in many rubber products, and even tiny percentages make impossible the attainment of a clean, white end-product. Not only superior white sidewall tires, but tires of any color are possible using this new material, ayers Dr. Fritz. Test tires are being made taking advantage of the material's non-interference with natural or applied coloring. According to W. S. Richardson, president of the B. F. Goodrich Chemical Co., which will market the material, commercial utilization of the new compound is still many months away because of its present high cost in relation to carbon black.

Personnel Changes

To promote mutual understanding and to increase the effectiveness of the organization, a new division of the company, the employe relations division, has been established, and Ward Keener has been elected head of this division with the title vice-president-employe relations. The Goodrich company explained that the duties of the division will be to render specialized service in the development of employe relations policies and programs and to assist members of management in their application. The responsibility and authority of operating management in the broad field of employe relations is in no way lessened by the establishment of this division. Each operating division retains full responsibility for the effective administration of the company's employe relations policies. The organization structure of the new division will be shaped slowly. For the present all units performing specialized employe relations functions will continue to report as in the past.

William L. Jenkins has been appointed manager of the recently created electronic applications development department of the Goodrich company. A graduate of Akron University with a degree in electrical engineering, Mr. Jenkins joined the company in 1940 and for the last several years had been an experimental engineer. Application of electronics to processes in the rubber industry are being rapidly expanded.

E. T. Lessig has been named manager of textile control in the tire division of the Goodrich company. He received his bachelor's degree in chemical engineering from Penn State University and his doctor's degree from the University of Wisconsin. He joined the company in 1931 and has spent much of his time on textile research.

W. F. Billingsley has been named manager of tire construction at Goodrich. A graduate of Case School of Applied Science, where he received his bachelor's degree in mechanical engineering, Mr. Billingsley joined the company in 1929 and was a tire testing and construction engineer. Next he was manager of tire testing from 1933 to 1941 and, when war came, was assigned to special tire development problems.

B. A. Evans has been named manager of the wheel and brake manufacturing department at Goodrich, which recently purchased the airplane wheel and brake division of Hayes Industries, Inc., where manufacturing operations are being conducted at present. Educated in England, Mr. Evans joined the company in 1916 and for several years was a development engineer, later on the engineering staff of the industrial products division. He was technical superintendent of the metal products division, which manufactured many war products for five years, and was superintendent of shops previous to his present appointment.

R. J. Keller has been made technical manager of the wheel and brake manufacturing department. A graduate of the University of Akron in mechanical engineering, Mr. Keller has been with the company since 1935.

Luther L. Baumgartner, recently discharged from the Navy, has joined the Goodrich staff as a biological chemist and has been assigned to the work the company is doing in the Boyce Thompson Laboratories, Yonkers, N. Y. Dr. Baumgartner, who received his bachelor of science degree at Capital University and his master's and doctor's degrees in philosophy at Ohio State University, has served as biologist in food habits research for the United States Wildlife Service and as research ecologist for the department of conservation in Michigan and Ohio. He is, moreover, the author of 35 articles on natural history and game animals.

Emory E. Smith has been appointed sales manager for Koroseal and other plastics merchandised by the International B. F. Goodrich Co., a division of The B. F. Goodrich Co. Mr. Smith, a graduate of Emory & Henry College, has been with the company since 1935 and for the last 18 months had been in its Washington offices.

Speaking before an SAE meeting in Pittsburgh, Pa., J. Earl Gulick, general manager of Goodrich's tire manufacturing division, stated that today's well-engineered synthetic rubber auto tire does not have to be coddled along at wartime speeds in order to compile its records for outwearing prewar natural rubber tires. Demonstrating the consistent improvement in performance of synthetic rubber tires, Mr. Gulick showed charts covering tread wear, skid and rolling resistance, and ply separation. Although the synthetic tires showed barely 90% of the wear of prewar tires during the first two years of development starting in 1943, Goodrich's present synthetic tires show greater mileage under test than the prewar article even at continuous speeds of 60 miles per hour with a 30% overload. The speaker emphasized that design and tire construction improvements were largely responsible for synthetic rubber's present showing in tires on identical tread designs. He said that prewar tires showed somewhat better properties of skid re-

sistance and traction in snow, but that improvements in tread design can offset this difference. Synthetic rubber has somewhat higher internal friction than natural rubber, creating greater rolling resistance, which may mean about 5% greater fuel consumption per car. The most striking improvement in synthetic tires has been the overcoming of ply separation, a serious problem in early synthetics.

Three million pounds of various kinds of rubber cement were produced at the Goodrich factory in Akron in one recent month, according to J. F. Anderson, manager of the company's cement processing department. The company uses two-thirds of its output in its own operations and provides large amounts to other industries, but at the present rate of production throughout the industry there should soon be an ample supply for all retail needs, said Mr. Anderson. Rubber cement, made in more than 400 varieties, is used as adhesive, protective, filling, and sealant material for thousands of purposes ranging from cementing rubber linings to steel tanks to affixing clippings in scrap books. The largest volume use of rubber cement is for impregnating tire cords, with shoe repair cement ranking second. The food canning industry is also a large-scale user, employing the cement as a sealing gasket in certain types of cans.

New Work and Acid Suit

Addition of a Koroseal work and acid suit to its line of industrial clothing was announced last month by Goodrich. Made from best-quality textile sheeting, coated black with Koroseal, the suit has been designed for maximum lightness and toughness, including resistance to abrasion and practically all solvents and acids. Jackets and pants are furnished separately or as a unit. The jacket has a fly front with concealed ball and socket fasteners, strapped armholes and seams, and stand-up collar. Pants are the bib type with adjustable shoulder straps in the back.

T. C. Davis, vice president in charge of mechanical sales of the Dayton Rubber Mfg. Co., Dayton, described the overall advertising, distribution, and merchandising programs of the company's mechanical lines at a recent management meeting. Dayton's industrial lines include automotive fan-belts, "D-R" railway drive belts, printing rollers, automotive radiator hose, and industrial V-belts, ranging in size from fractional horsepower to thousand horsepower. Mr. Davis also pointed out that in 41 years the Dayton company has grown from a small one-story building to its present main plant which covers 38 acres and has 20 acres of floor space.

Hundreds of diversified products manufactured in Dayton were exhibited in 66 booths at the recent Dayton Foremen's Club Industrial Exposition. Featured by Dayton Rubber were a Butyl inner tube; a Thorobred "Dated" tire; samples of natural and synthetic rubber in their various stages of production; and Dayco printing rollers, Dayton V-belts, fan belts, and railway belts, beneath huge enlargements showing the products in use.

Firestone Announcements

The Firestone Tire & Rubber Co., Akron, has opened a new district office in Sacramento, Calif., at 1811 12th St., to serve the territory from Tulare in Central California north to the Oregon border and most of the state of Nevada, it was announced by William H. Ryan, district manager. At the official opening of the building, completed at a cost of more than $100,000, Leonard K. Firestone, president of the Firestone Tire & Rubber Co. of California, was present, together with R. W. Davis, of Los Angeles, Pacific Coast division sales manager. A luncheon, sales meeting, and reception featured the gathering of Firestone dealers from the area served by the new district office.

William S. Wilson, manager of Firestone's war products division, has been named assistant manufacturer's sales manager with headquarters at Akron. Mr. Wilson, who will assist H. M. Taylor, manager of the manufacturer's sales division, has been with the company 20 years. Except for the period during the war when he was with the war products division, his entire experience with the Firestone organization has been in the sales department.

W. W. Llewellyn, Jr., former sales and advertising manager of the Fort Pitt Bedding Co., Pittsburgh, Pa., has joined The Firestone Industrial Products Co. as product manager in charge of the distribution of all Foamex bedding. Bringing to Firestone a well-rounded experience in distribution, Mr. Llewellyn first entered the business in 1925. He left the Ingraham Mfg. Co., which he headed, to become affiliated with the Fort Pitt company, where he gained an intimate knowledge of bedding construction and retail distribution. With Firestone, Mr. Llewellyn will direct the company's presentation of Foamex bedding to the retail trade.

The importance of proper inflation of tractor tires to obtain maximum service life was recently emphasized by D. E. Auten, chief of Firestone's tractor tire development. He pointed out that underinflated tires will give only one-fifth of the normal service of properly inflated tractor tires because of excessive wear and susceptibility to rim bruises, sidewall snagging and cord body breaks. Overinflation will give only half of the normal service because of slippage, rapid tread wear, excessive weather checking, and susceptibility to punctures due to greater sidewall strain. Hydro-flation of tractor tires, as obtained by use of the electric Hydro-Flator, available at Firestone stores and dealers, has been proved by tests to be the least expensive and most satisfactory form of tire weighting and gives greater tractor efficiency. Hydro-flation adds weight to tractor tires and increases drawbar pull. The pneumatic principle is retained in Hydro-Flation, and tests have shown that the air cushion remaining after a tire has been partially filled with liquid easily absorbs the shock of jolts and jars and lengthens the life of the cord body.

The recent addition of wire-backed brake lining production to manufacturing facilities at Firestone's Newcastle, Ind., plant has revealed the hairline weights and measurements adhered to in the production of this rugged type of lining, available for both original equipment and replacement purposes. While the mixing and finishing processes used are common to linings of this type, extrusion of the lining itself still is unique, and the specially designed machines used for this purpose are the only ones of their kind in the industry. Many mixers and measures used in the manufacture of bread are used in mixing ingredients for the brake lining. The mixture combining oils and asbestos fiber, after being formed into the wire-backed lining, is carefully rolled and then placed into huge ovens and baked. From the oven the lining goes through finishing processes which include use of a machine that in two operations drills 12 counter-sunk holes.

Expanding Foreign Operations

Further expansion of South American operations to facilitate production and distribution of tires, shoe products, retread and repair materials in a worldwide manufacturing and marketing program was announced May 15 by Goodyear Foreign Operations, Inc., a subsidiary of The Goodyear Tire & Rubber Co., Akron.

Besides plants now in operation in Colombia and Venezuela, a third factory at San Jose de las Lajas, 20 miles from Havana, Cuba, will soon be placed in production.

A. G. Cameron, vice president and general manager of Goodyear Foreign Operations, said the new plants will extend Goodyear manufacturing operations to 14 countries. Other factories are in Argentina, Australia, Brazil, Canada, England, Eire, India, Peru, South Africa, Sweden and Mexico. The latter plant was purchased in 1941 and modernized last year. Mexican production includes tires, industrial belting, hose and rubber heels.

The new Colombia plant is at Cali; while Goodyear de Colombia S. A. also operates repair and retread units at Cali and Barranquilla, under the direction of Sullivan Kafer, manager; Edward N. Jacobs, factory superintendent; and James M. Koon, office manager.

Heading the Venezuelan operation at Caracas is Edward G. Bahr, managing director; William E. Forster, factory superintendent; and Ernst S. Birnbaum, office manager.

Goodyear has also established a repair and retread shop at Santiago de Cuba, and this same service will be available with the opening of the Havana plant. Activities of The Goodyear Tire & Rubber Co. of Cuba are in charge of Richard P. Morgan, managing director; M. A. Ryan, factory superintendent; and Eugenio Riveroll, treasurer.

Appointment of R. B. Willett as personnel manager of Goodyear's new tire and mechanical goods plant in Uitenhage, South Africa, has been announced by George K. Hinshaw, production manager of Goodyear foreign operations. Mr. Willett came to Goodyear 20 years ago after graduating from the University of Akron with a mechanical engineering degree. During the war he was in charge of production planning at Goodyear Aircraft Corp.'s Plant D.

Two other members of the South African factory organization, Henry Watts, purchasing agent, and Henry Brundage, operations manager, are already in Uitenhage. V. L. Follo, who

will serve as plant manager, departs soon for South Africa.

Now under construction, the South African factory will open early next winter, manufacturing tires, tubes, belting, and hose.

Return of six officials from plants in five foreign countries for reassignment in domestic organizations has been announced by G. K. Hinshaw, Goodyear's production manager foreign operations. The men returning are: Alvin J. Slay, purchasing agent, and Melville W. Mears, division superintendent, Australia; John D. Campbell, division superintendent, Sweden; Russell A. Spoonamore, production representative, India; John R. Oakley, manager technical service, Brazil; and R. J. Perrin, mechanical goods superintendent, England. Mr. Slay had been with the Australian organization 20 years and Mears 11 years. Mr. Perrin was in England eight years, Mr. Campbell in Sweden seven years; while Oakley and Spoonamore had been on their assignments four years. No new assignments have been announced for the men, all of whom are now enjoying home leave.

Personnel Activities

E. T. Rainey has been made manager of manufacturers sales for Goodyear's western division and will be stationed at Los Angeles. He was former district manager of aviation products division for the company in Seattle, Wash. He will be assisted by R. E. Bolton, in the off-the-road farm implement and agricultural machinery fields in that area; while William van Amerongen, in Seattle, will contact the automotive manufacturers in the Pacific Northwest.

With the company since 1927, Mr. Rainey had served in St. Louis, Seattle, Portland, Ore., Salt Lake City, and San Francisco prior to his current assignment.

Mr. Bolton's Goodyear service dates to 1929, and at the time of his joining the Army as a rubber specialist in the office of the Chief of Ordnance, Washington, he had been a truck tire representative in St. Louis and Chicago. In the Army he was a lieutenant colonel and spent part of his time as rubber specialist in Detroit.

Following field contact work in Los Angeles in 1941, Mr. van Amerongen was on a sales engineering assignment with the company's fuel tank lining division in Seattle and later on similar work with Goodyear's aviation products division.

Reorganization of the top executive group of Goodyear Aircraft Corp. was announced May 21 by P. W. Litchfield, chairman of the board of the parent Goodyear Tire & Rubber Co. and president of Aircraft, following the resignation of H. E. Blythe, as vice president and general manager. His successor is Russell De Young, who throughout the war served as Aircraft's vice president in charge of production. T. A. Knowles continues as vice president in charge of sales; while Karl Arnstein remains vice president in charge of engineering and design. The operating committee of Aircraft consists of Mr. De Young, Mr. Knowles, and Dr. Arnstein, with Mr. De Young as chairman.

Mr. Blythe is leaving Goodyear after 31 years of service to enter private business.

Mr. De Young joined Goodyear Tire in 1928, while studying Akron University's cooperative engineering course. Graduated from the University in 1932 with a B.S. in industrial engineering, he started on the Goodyear production squadron, from which he was graduated in 1934 and was Litchfield award winner as the outstanding member of his class. One of the group sent to Buitenzorg, Java, in 1934 to start production there he remained until 1936; then he returned to the Akron plant in the technical service division. He was one of 10 men in the country in 1939 to win Sloan scholarships at Massachusetts Institute of Technology, from which he received his master's degree in business engineering and administration. Appointed assistant to the president of Goodyear Aircraft in June, 1940, he was made vice president in May, 1942.

Back to his post as assistant credit manager of the Goodyear company is R. H. Naylor, who until his release from Navy duty on April 20 served as lieutenant commander with the supply corps in Boston, Mass. He had been in the service since February 1, 1943. A Goodyear veteran of 18 years, Mr. Naylor joined the company at Boston as credit and collection clerk, following graduation from Bentley School of Accounting & Finance. Service as chief clerk preceded his appointment as district credit manager in charge of the Boston and Hartford districts. In March, 1933, he was transferred to Akron.

Division managers of the Goodyear company last month assembled in the home office to discuss sales plans with top executives of the organization. Among those attending the conference were R. W. Fitzgerald, western district manager, Los Angeles; D. W. Sanford, vice president, Goodyear-California, Los Angeles; F. W. McConky, Jr., northeast division manager, New York; J. E. Mayl, vice president and sales manager, tire division, Akron; J. A. Bailey, south central division manager, Dallas; A. Jae Sears, north central division manager, Chicago; and L. H. Shepherd, southeast division manager, Atlanta.

E. J. Thomas, Goodyear president, last month received a 30-year service pin, presented by Chairman Litchfield.

C. P. Joslyn, manager of the chemical products division, last month completed two decades with Goodyear and was presented with a 20-year service pin by Vice President R. S. Wilson.

In appreciation of services rendered during World War II, Chief of the Bureau of Aeronautics has issued naval aviation technician cards and certificates to five members of Goodyear's aviation department who were active in assisting naval aviation personnel in maintenance and repair of Goodyear products utilized by the Navy Department. They are: John E. Leonard, James Gardner, R. H. Vogel, Clair T. Zimmerman, and Carl B. Householder, all of whom were field service representatives.

Improved Products Developed

A new synthetic copolymer resin has been developed by scientists of the Goodyear research laboratory. According to L. B. Sebrell, director of the laboratory, the new resin, known as Pliolite S-5, is not only capable of conserving natural oils and resins in the manufacture of indoor paints of all types, but it also results in an improved product. A wide variety of uses for Pliolite S-5 are seen by the chemical products division of the company, which will market this product to the paint industry. Herman Thies, manager of the plastics and coatings department of the division, expects Pliolite S-5 to be used in acid- and alkali-resistant coatings, concrete floor enamels, architectural finishes of all sorts, oil and grease resisting coatings, baking enamels, corrosion resistant coatings for marine use, and many other applications. The new material offers many advantages over the original Pliolite, a natural rubber base product. The original material, not being completely saturated, took up 8% of oxygen during aging and grew brittle; while Pliolite S-5 will not take up oxygen even at 100° C. The new material also differs from the old Pliolite in that it is not soluble in the 100% aliphatic hydrocarbon thinners, but is soluble in aromatic hydrocarbon thinners and mixtures of aliphatic and aromatic thinners. A further advantage of Pliolite S-5 is that it is soluble in its unmilled form; while the natural rubber product had to be masticated in a two-roll mill to render it soluble.

In addition to these properties, Dr. Sebrell stated that Pliolite S-5 possesses excellent color and clarity, has no objectionable paint odor, is non-toxic, can be diluted considerably without separation or precipitation of pigments, has low solvent retention, permitting quick drying, dries by evaporation and does not require an oxidizing period, is nonsaponifiable, and is highly resistant to water, moisture vapor, alcohol, acids, alkalies, soaps, and other corrosive influences. The new material can be furnished to paint manufacturers in two ways: either directly, or after being processed into a Pliolite base consisting of a dispersion of the desired pigment in the solid resin.

The development of a new Pliofilm fabric that is washable, waterproof, scarproof, and so tough that it cannot be scratched with a knife, was announced by Goodyear's chemical products division. However, C. P. Joslyn, manager of the division, said that the company does not plan to launch these fabrics on the market until natural rubber is again freely available. Behind the new fabric is the creation of a new Pliofilm thread expected to compete in many fields with existing natural and synthetic fibers. Hitherto produced only in sheet and film forms, fibers made of Pliofilm can be twisted into a thread and then woven into a fabric. The thread can be made in a variety of weights, resulting in an even greater variety in the finished fabric. It can be produced in any color, and by the combining of different colored threads, the resultant fabric can be given any desired pattern. At the present time, Pliofilm in the form of sheets and films for the packaging field absorbs the entire amount of the material which the company is able to manufacture under the present limitation set by the government. Upon lifting of the restrictions, wide use of the new fabric is foreseen, including seat upholstery for homes, airplanes, cars, and other conveyances; light, rugged, and scuffproof luggage; general furniture upholstery for hotels, public buildings, and homes; and many other applications.

Advantages of ruber-tired equipment in the rice fields over the steel-wheel

tractors that have been in use for some years were demonstrated recently near Wynne, Ark., before spectators including farm implement officials, Goodyear farm tire representatives, farm implement dealers, and rice farmers. Those present reported that the rubber-tired tractor performed much more work with less fuel in every respect. At the conclusion of the third time around the course pulling disk harrows, the rubber-tired tractor had traveled 9,720 feet as against 8,400 feet for the steel-wheel tractor, a difference of 1,320 feet in the same time, representing an increase of 15.7% in work done, or an hour and 22 minutes saved per 10-hour day. Tests also made on fuel consumption showed that the rubber-tired tractor would travel 25% farther on the same amount of fuel with the same load than the steel-wheel tractor.

Increasing adaptation of light metals to new and improved products has brought methods of adhering rubber to these metals from the laboratory to the production line at Goodyear's St. Marys manufacturing division. Typical examples of the scope of new adhesion methods are rubber-cushioned aluminum mountings for helicopters, synthetic tires bonded to industrial wheels made of aluminum, rubber-covered zinc die-cast metal splines for washing machine gyrators, and bushings using a steel outer metal and powdered bronze inner metal with rubber cushioning bonded to both surfaces. These handling techniques open large fields to the design engineer for using rubber in conjunction with his product. The fact that stainless steel, heat-treated carbon steels, hardened aluminum, and many other metals are now generally acceptable for rubber adhesion further extends the engineering boundaries.

According to Cliff Slusser, vice president in charge of production for Goodyear, added strength and longer service life of farm implement and small-size tractor tires are assured by the development and use of the company's automatic power attachment for tire bead construction which makes possible uniformity and durability never before attained. The new device is an electrical attachment which integrates the bead wire firmly into the tire, conforming to the minute specifications required. Both tire and bead are built in a single operation. Key to the improved method is its ability to keep the wire taut as it is rolled into the bead, thus surpassing any previous technique that had been employed.

The government's refusal to grant priorities on materials has doomed Goodyear's plan to help relieve the nation's acute housing shortage. Goodyear had offered to build close to 50,000 two-room, prefabricated homes within a year if necessary materials were made available by the government. Rejection of the program was revealed by Mr. Litchfield, who charged that the action of the federal officials was a blow at the system of free enterprise. The administration's objection was based principally on the grounds that the homes are too small and fail to come up to federal specification on total floor space, Mr. Litchfield explained. Because of the acute material shortage, construction of the homes has been limited to one or two a week in a pilot-plant at Litchfield Park, Ariz.

Adamson United Elections

At the annual stockholders' meeting of Adamson United Co., Akron, O., a subsidiary of United Engineering & Foundry Co., held in the executive offices of the latter concern in Pittsburgh, Pa., April 16 the following officers were elected: John Quinn, chairman of the board; F. L. Dawes, president and general manager; Andrew Hale, vice president in charge of sales and engineering; William Hagel, vice president; George Lang, secretary-treasurer; George Fenn, assistant secretary-treasurer. The following directors also were elected for the ensuing year: F. C. Biggert, chairman of the board, United Engineering; K. C. Gardner, president, United Engineering; Mr. Lang, who is also treasurer of United Engineering; Mr. Quinn; Mr. Dawes; Mr. Hale; as well as Harry M. Naugle.

Adamson United reported that business on its books is the highest in its history and that all of its products, basic equipment for the rubber, plastics, and plywood industries, have been completely redesigned since hostilities ceased last summer.

Changes at Goodrich Chemical

New appointments in the Hycar synthetic rubber, rubber chemicals, and reclaimed rubber division have been announced by Allyn I. Brandt, general sales manager, B. F. Goodrich Chemical Co., Rose Bldg., Cleveland.

J. C. Richards, Jr., becomes sales manager for rubber chemicals besides being sales manager for Hycar synthetic rubber and reclaimed rubber.

W. D. Parrish is now technical service manager for rubber chemicals as well as technical service manager for Hycar synthetic rubber.

C. B. McKeown, formerly technical manager and coordinator for synthetic rubber production, has been made technical service staff representative—synthetic rubber and rubber chemicals.

B. S. Garvey, Jr., formerly technical service manager for rubber chemicals, has been transferred to the company sales development staff.

J. H. Rines becomes staff representative in the Cleveland office for synthetic rubber and rubber chemicals, in addition to his duties as eastern sales representative for reclaimed rubber.

Ray E. Bitter, formerly Midwest territory technical service engineer for Hycar rubbers, has been made sales representative on the Pacific Coast, with headquarters at 1248 Wholesale St., Los Angeles 21, Calif., replacing D. C. Maddy, who has entered business for himself. Mr. Bitter will handle sales of Hycar rubbers and Geon polyvinyl materials in states west of the Rocky Mountains as well as Texas.

Howard E. Anderson, a salesman of reclaimed rubber for the last 13 years, has been appointed to the Midwest post, with headquarters in the company's offices in Chicago.

Expansion of the operations and facilities of the principal offices of Goodrich Chemical in Cleveland, caused by increased demand for technical information required in serving customer problems and inquiries, was revealed last month by W. S. Richardson, president. An additional 2,300 square feet have been obtained in the Sloan Bldg., adjacent to the company's headquarters in the Rose Bldg., and will house new testing and evaluating equipment. The engineering department, formerly on the third floor of the Rose Bldg., with the general offices, has been moved to the seventh floor, where 2,350 square feet of floor space are being occupied.

New Rocket Perfected

Development of rocket power as war insurance is still continuing, naval air officers told more than 100 aeronautical scientists at a display of air and fire power at the Patuxent Naval Base, Md. Scientists of the Aerojet Engineering Corp. and its parent company, the General Tire & Rubber Co., Akron, have developed a rocket one-third more powerful than the German V-2 bomb. Known as Moby Dick, this new rocket develops a thrust of 66,000 pounds. According to William O'Neil, president of General Tire, the rocket may be used either to hurl a large explosive charge more than 30 miles or to launch the rocket fighter ships of the future.

The Timken Roller Bearing Co., Canton, has announced that a new method for making bearings metallurgically and geometrically more perfect is being tested at its pilot plant at Zoarville before being adopted on a factory-wide basis. The process, a project of the company's division of development and research, has been used by the pilot plant in making roller bearing parts for the past year. The plant, which is under supervision of Eugene G. Weber, maintains a staff of eight women and ten men.

Six naval veterans and a former member of the War Production Board have recently returned to their prewar jobs in the industrial division at Timken. The veterans and their present positions are as follows: R. G. Harmon, field engineering, Chicago; D. G. Gibson, field engineering, Cincinnati; S. T. Salvage, assistant district manager, industrial division, Cleveland; R. L. Williams, field engineer, Cleveland; F. J. Hartshorne, field engineer, Milwaukee; and L. M. Meyer, field engineer, Pittsburgh. L. H. Gegenheimer, the former WPB member, is now district manager of the industrial division in Boston.

Industrial Rayon Corp. honored 24 employes who sacrificed their lives in World War II, by memorial tree plantings on the grounds of the company's Cleveland, Painesville, and Covington plants. Planting of the trees was completed in Arbor Day observances at Cleveland and Painesville on April 26, and followed similar plantings at Covington three weeks before that. The trees were dedicated on Memorial Day, when individual bronze plaques bearing the names of the war dead were formally unveiled in the presence of the families of the deceased war heroes.

Directors of Industrial Rayon held a meeting on May 17 at which all the company's officers were reelected.

MIDWEST

Automotive Golden Jubilee

The Automotive Golden Jubilee celebrating the fiftieth anniversary of the birth of the automobile industry was held in Detroit, Mich., from May 29 through June 9. At the same time Detroit observed the one hundred and fiftieth anniversary of the raising of the American flag over the area. The jubilee included pageants, tributes to pioneers, parades, festivals, interfaith rallies, and an antique automobile exposition. Organizations throughout the country sponsored regional, state, or local celebrations on a smaller scale.

A feature of the program was the Antique Automotive Exposition, sponsored by the National Automotive Industry Golden Jubilee Committee, held at Convention Hall daily from June 3 to 9. Displayed was one unit of each of the newest model cars against a picturesque background of scores of early automobiles and trucks.

At a press luncheon in the Hotel Biltmore, New York, N. Y., on May 17, Lt. Gen. William S. Knudsen, general chairman of the jubilee, pictured the automotive industry as now uniting in a renewed spirit of cooperative enterprise for peacetime production. George Romney, general manager of the Automobile Manufacturers Association, announcing an estimated production of 1,200,000 passenger cars and trucks for the first 12 months of peacetime operation, stated that this production was disappointing because of strikes, material shortages and controls, but the economic impact of the motor industry on the nation would be felt as soon as the industry hits its stride.

Back from the war after a colorful career in the Navy's anti-submarine service, the Goodyear Tire & Rubber Co.'s airship *Ranger*, formerly the Navy L-8, was scheduled to fly in to Detroit from Akron on May 29 and stay until June 2. The airship will carry trailing banners of Detroit and other Michigan cities and do other promotional work for the celebration. K. L. Fickes, in charge of airship operations for Goodyear, and Russell Crosier, chief pilot, will direct the operation.

United States Rubber Co. sponsored ABC's exclusive four-station television coverage of the jubilee, it was announced by Paul Mowrey, chief of the American Broadcasting Co.'s television operations, and Charles J. Durban, assistant advertising director of U. S. Rubber. The jubilee film will be rushed East by special airliner for editing and broadcasting from New York, Washington, Philadelphia and Schenectady. The half-hour visual record will also be seen by audiences throughout the nation when the company will show sound motion pictures based on the telecast. Automobile dealers will be invited to see the film when it is exhibited in cities in which the company's tire branch offices are located.

New Engineering Society

The formation of a new engineering society, The American Society of Body Engineers, Inc., has been announced by its president, I. Louis Carron, body engineer of the Detroit Harvester Co. The society has been organized as a non-profit corporation with national headquarters in the Rackham Memorial Bldg., Detroit, Mich. It is an aggressive organization composed entirely of leading body engineers from practically all companies in the automotive industry. A technical convention will be held in October by the Society, with Carl W. Cenzer as general chairman. Elaborate plans are already well under way; and committees are being formed and are to be headed by capable and experienced men who have devoted many years toward the progress of body design and engineering.

The Meyercord Co., Chicago, Ill., is distributing a new slide-rule type of decalcomania selector to assist manufacturers and product designers in the specification of the correct decal name plate, trade mark, instruction or wiring diagram for application on difficult and unusual surfaces. The selector enables the prospective user to determine quickly how 11 types of decals may be applied to 14 different surfaces, using any one of seven application methods. Application techniques shown vary from simple water adhesives to special cements, all adaptable to production line speeds. The selector indicates decals resistant to abrasion, acids, and extremes of humidity and temperature, and their application to paint, lacquer, enamel, wood, glass, metals, cloth, rubber plastics, and even crinkle finishes.

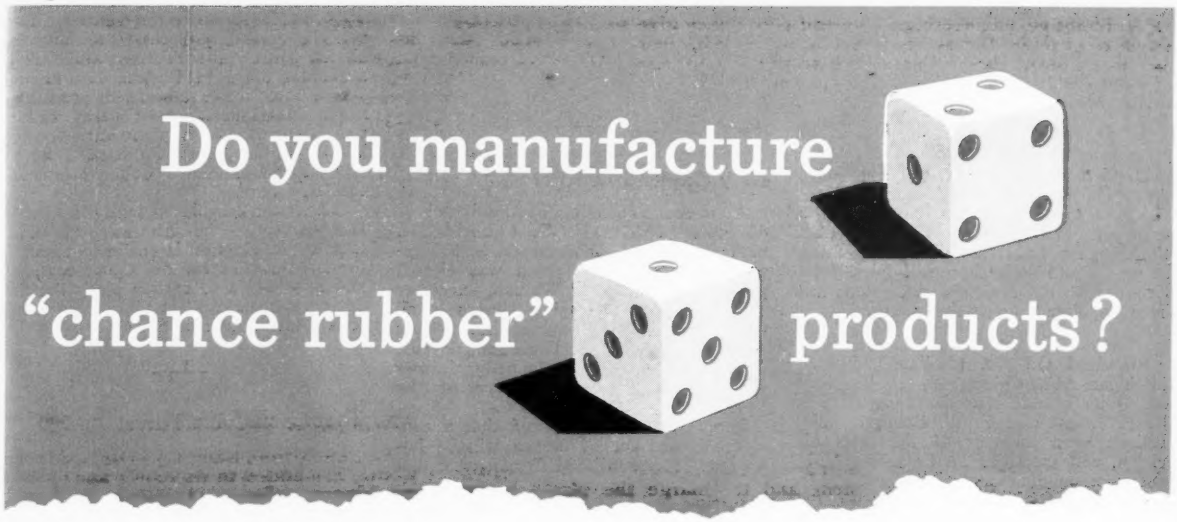
Meyercord Slide-Rule Type of Decalcomania Selector

Grants Academic Leaves

Monsanto Chemical Co., St. Louis, Mo., through Carroll A. Hochwalt, director of central research, has announced the inauguration of an academic leave for the company's scientists to enable them to return to universities of their choice for an academic year of study at full salary. Addressing the National Industrial Conference Board, Mr. Hochwalt said the leave of absence was established by Monsanto's executive committee to encourage the scientific work and development of technical personnel in physics, chemistry, and chemical engineering. Four leaves will be granted each year and will be made on the basis of especially meritorious service and outstanding performance. Dr. Hochwalt emphasized the need of training in order to achieve scientific and technological advances. Stating that industrial research has had a phenomenal growth in the United States, Dr. Hochwalt said that in 1920 approximately 300 industrial laboratories were in existence with a research personnel of about 7,500 and a total budget of $30,000,000. In 1940 the number of industrial laboratories had increased to 2,350 with 70,000 scientists and expenditures of more than $250,000,000. He predicted that by 1950 industrial research will have increased two hundredfold since 1920, with about 3,500 laboratories and 150,000 scientific personnel.

Edwin L. Hobson has been named to the sales staff of Monsanto's plastic division. He will spend several months at the Springfield, Mass., plant and will then be assigned to one of the division's branch offices. Recently discharged as lieutenant colonel of the Quartermaster General Office, Mr. Hobson served through the war as plastics section chief of the Military Planning Division's Research and Development Branch. In this capacity he directed technical phases of a program involving the fabrication of more than 150 million pounds of plastic raw materials and supervised a large staff engaged in research, design, and development work. From 1937 to 1941, Mr. Hobson was a sales engineer for the Bakelite Corp.

T. P. Sands, for 10 years lubrication engineer for the Gulf Research & Development Co., has joined Monsanto in St. Louis as automotive engineer in the research department of the organic chemicals division. Mr. Sands, who will work with F. L. Matthews, coordinator of production research and sales activities on petroleum chemicals, while associated with Gulf, did much work in the evaluation of lubricant compositions. At Monsanto he will be specifically responsible for the technical coordination of petroleum chemicals evaluation. This will cover the testing program of Monsanto oil addition agents, both from the research and the sales aspects as well as the development of optimum test procedures. As a member of the coordinating group, Mr. Sands will serve as consultant on current practices and new



If you do, you're probably not aware of it. But you can't afford not to be... and with Perbunan you can eliminate any "Chance" in your products!

Perbunan's versatility and quality are shown in this comparison of Perbunan 18 and 26 in a recipe for services requiring a combination of good low-temperature properties and good aging in oils at high temperatures.

Perbunan is designed in different types for different jobs. You can choose the proper Perbunan for the application. The service dictates the polymer, but Perbunan represents high quality!

Stanco rubber technologists are anxious to help with your problems. Get in touch with the office nearest you.

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THE SYNTHETIC RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

STANCO DISTRIBUTORS, INC., 26 Broadway, New York 4, N. Y.; First Central Tower, 106 South Main Street, Akron 8, Ohio; 221 North La Salle St., Chicago 1, Illinois. West Coast Representatives — H. M. Royal Inc., 4814 Loma Vista Avenue, Los Angeles 11, California. Warehouse stocks in Elizabeth, New Jersey; Los Angeles, California; Chicago, Illinois; Akron, Ohio; and Baton Rouge, Louisiana.

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BASE RECIPE

Perbunan	100.0
Zinc Oxide	5.0
Stearic Acid	0.5
Semireinforcing Furnace Black	75.0
Santocure	3.0
Tetramethylthiuram disulfide	3.0
Tributoxyethyl phosphate	10.0

PERBUNAN COMPOUND	8975-1 Perbunan 18	8975-2 Perbunan 26
Original Physical Properties		
Cured 60 minutes at 287 F		
Shore Hardness	50	51
Tensile, psi	1800	1950
Elongation, per cent	500	510
Modulus at 300 per cent Elongation, psi	1160	1265
Compression Set 30 per cent Constant Deflection		
70 hr at 212 F, per cent	14	15
70 hr at 250 F, per cent	26	25
High Temperature Oil Aging		
ASTM Test Oil Number One		
70 hr at 300 F		
Shore Hardness change	+2	+7
Volume change, per cent	−2	−7
Tensile, psi	2340	3020
Elongation, per cent	350	420
ASTM Test Oil Number Three		
70 hr at 300 F		
Shore Hardness change	−21	−10
Volume change, per cent	+42	+16
Tensile, psi	1080	1750
Elongation, per cent	300	335
Low Temperature Flexibility		
ASTM Bend Test D736-43T		
Passed at, degrees F	−70	−60

developments of automotive engineering. A native of Armstrong, Iowa, Sands received a B.S. in mechanical engineering at Iowa State College in 1933.

Dryden Rubber Co., 1014 S. Kildare Ave., Chicago 24, Ill., has elected Oliver G. Vinnedge vice president and general manager. Mr. Vinnedge has been with the company since 1924, formerly serving as vice president in charge of sales. John Groot, with the company since 1921, has been appointed purchasing agent.

Standard Oil Co. (Indiana), 910 S. Michigan Ave., Chicago 80, Ill., has added to its chemical products department R. E. Elliott and C. W. Burdette. Mr. Elliott, as a member of the sales division, will specialize in the sale of rubber compounding materials; while Mr. Burdette will be associated with the sales development division. Mr. Elliott for the past decade had been in development work with Ideal Roller & Mfg. Co., Chicago, and Mr. Burdette prior to 3½ years in the Navy had been employed by Monsanto Chemical Co.

NEW ENGLAND

Darex Copolymers Produced

Dewey & Almy Chemical Co., Cambridge, Mass., has announced that full-scale production of the first of a series of Darex copolymers has now been attained. According to Alan G. Richards, manager of the company's organic chemicals division, facilities now available at Cambridge are producing Darex copolymers 2 and 3, and additional equipment for synthetic rubber and resin production is being installed at the company's plant in Acton, Mass. Laboratory evaluation and small-scale factory use have shown the Darex copolymers to be efficient processing aids and compounding ingredients, helping to improve abrasion resistance and flexibility in GR-S and natural rubber, hardness and tensile strength in molded semi-hard rubber electrical and automotive parts, dielectric strength and moisture resistance in GR-S, GR-I, and GR-M wire insulation, and the rate of extrusion and smoothness in thin-walled GR-S tubing and neoprene hose. Darex copolymers are compatible with natural rubber, with GR-S, Buna N, Butyl, and neoprene synthetic rubbers, and with various types of plastics. Tests indicate excellent possibilities for improving feel and embossing characteristics of coated fabrics and artificial leathers; for increasing resilience and toughness of hard rubber, Buna N grinding wheels, and molded plastics; for imparting good chemical and moisture resistance to rubber resin base paints and paper coatings; and for bettering wearability and color possibilities in rubber tile and flooring. As processing aids in extruded hose and wire insulation, Darex copolymers impart smoothness to gum rubber stocks; in calendered and spread goods, they give smoother, glossier surfaces; and in mold goods, they increase the ease of flow and reduce mold shrinkage.

New Canfield Officers

At a recent meeting of the board of directors of The H. O. Canfield Co., manufacturer of rubber products, Bridgeport, Conn., Hans Wyman was elected president; Charles A. Wyman, executive vice president in complete charge of all operations including manufacturing and sales; and John F. Dunnigan, elected vice president. H. J. Donnelly, former president, was made chairman of the board.

It was further announced that a considerable amount of money will be immediately appropriated for new equipment and to enlarge the plant's manufacturing facilities.

Prior to his appointment as executive vice president Charles A. Wyman was president of Universal Plastics Corp. and assistant vice president of Eversharp, Inc. Mr. Dunnigan was previously treasurer of Universal Plastics Corp. and controller of General Aircraft Corp.

Plant producing capacity is being increased immediately, and new equipment will be installed. Production facilities are being enlarged to turn out the enormous backlog of orders for die-cut, molded, and extruded rubber items for practically all industry. In addition top manufacturing personnel, thoroughly experienced in every phase of rubber manufacture and production, will be added to the staff immediately to supervise the operation of both old and new equipment and to assure highest quality production right down the line.

Simonds Advanced by Cabot

Godfrey L. Cabot, Inc., manufacturer of carbon black, Boston, Mass., effective May 1, promoted Donald Simonds to assistant general sales manager under Owen J. Brown, Jr. Mr. Simonds first came to Cabot after his graduation from Tufts College and after he had been at Harvard University as research assistant on chemical problems. Much of his work in the carbon black company has been in technical sales and service with special attention to the problems of the rubber industry. His preparation for his new post includes working out the problems of the rubber compounders in their laboratories, and laboratory work in carbon black production in the Southwest. Mr. Simonds was assistant manager of Cabot's special products division prior to the war. He left the company to enlist in the United States Navy and served in the Pacific 32 months. He also belongs to the American Chemical Society and Delta Upsilon Fraternity.

Alfred Nash, of Hughes & Hughes, Ltd., agent in Great Britain for Godfrey L. Cabot, Inc., has just flown back to London after a month's business trip in America. This also was his first visit to the United States for consultation with Cabot officials since 1937, because of the war. Throughout the war years Mr. Nash served in the British Ministry of Supply, in Rubber Control.

During his stay in the United States, Mr. Nash not only discussed the overseas market situation with Cabot officials in the main office in Boston, but flew to Texas for further talks with production heads in Pampa, where many of the Cabot carbon black plants are located. While in the Texas Panhandle, he inspected the expanded Cabot production facilities there.

Mr. Nash has been with Hughes & Hughes since the firm was founded. Hughes & Hughes is the sole agent in the British Isles for the Cabot company, and in addition to carbon black the firm deals in chemicals which are raw materials for British industries.

Thompson Joins Farrel

Farrel-Birmingham Co., Inc., Ansonia, Conn., has added to its rubber and plastics machinery sales organization Edgar S. Thompson, formerly with Armstrong Cork Co., Lancaster, Pa.

A native of New Hampshire, Mr. Thompson received a B.S. in chemistry from the University of New Hampshire and a master's degree in chemical engineering from Harvard University.

In 1933 he joined General Chemical Co., where he served successively as production and development engineer. Then in 1939 he went to the Armstrong company, acting until 1942 as plant engineer at its Pensacola plant. Next he was transferred to project engineering work in the central engineering department at Lancaster.

Mr. Thompson belongs to the American Chemical Society, American Society of Mechanical Engineers, and Society for Advancement of Management. He has also conducted several courses in applied chemistry and engineering and has frequently contributed articles to trade publications. Besides he has been granted 27 patents on mechanical designs and chemical processes.

Plastics Divisions Transfers

William H. Milton, Jr., manager of the plastics divisions of General Electric Co., Pittsfield, Mass., last month announced two executive personnel changes.

David FitzGerald was made manager of employe relations for the divisions, responsible for coordination of employment and rates; he will represent the divisions on all matters pertaining to collective bargaining agreements. Mr. FitzGerald had been assistant to the manager of the plastics divisions since 1940, to which position he was appointed after six years as auditor. He entered the employ of General Electric in 1921 in the general office accounting department. He was transferred to the traveling auditing staff in 1925, where he remained eight years prior to coming to Pittsfield in 1933.

Guy M. Stone was named manager of the Coshocton, O., plant of the plastics divisions. The Coshocton factory, to be used for the manufacture of laminated plastics, is now under construction. Mr. Stone served since 1939 as manager of the Lynn Works of the G-E plastics divisions, from where the laminating manufacturing operations are soon to be transferred. He has been with the company for 30 years, in Schenectady, Baltimore, Philadelphia, Meriden, and Pittsfield.

CUTS MILLING-TIME 15%

SUN RUBBER-PROCESSING AID...

Used by Hose-Manufacturer for Faster Milling

A prominent manufacturer of special-duty hoses could not get the desired softness when milling Neoprene and pure gum rubber. He was using competitive processing oils as softeners. Shore Durometer hardness of under 25 was desirable, but not possible to obtain.

After consulting with a Sun Engineer, he switched to Sun's Circo Light Process Oil, and for two years has been able to obtain a Shore hardness of 20 and lower with the physical properties satisfactorily maintained. Milling-time has been cut by as much as 15%.

No blooming, or migrating, has been experienced, indicating the complete compatibility of Circo Light with the rubbers used.

For Neoprene, for natural rubber, for Buna-S, Hycar, or other synthetics, Sun technologists have developed remarkable processing aids that permit faster processing, better finished products. Call the Sun Engineer near you, and put the Sun experience and know-how to work in your plant today.

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INDUSTRIAL PRODUCTS

The Goodyear Fabric Corp., New Bedford, Mass., subsidiary of the Goodyear Tire & Rubber Co., has announced that bicycle tires at the rate of 10,000 per day will soon be rolling from production lines. Modern tire building machines and vulcanizing equipment have been installed at the plant, which is expected to employ upward of 350 men and women. Two types of bicycle tires will be made: the first, a single tube tire in which the inner and outer sections are in one piece; and the other type, a tire having both an outer casing and an inner tube. There are several of each size in general use, and the factory will make a full line comprising all standard sizes in both types of tires. Other products manufactured at the plant include camelback, repair materials and sectional airbags for tires, fuel cells for planes, and life rafts and vests for commercial use.

PACIFIC COAST

Thermoid Plant Sold

Sale of The Thermoid Rubber plant at South Clarence St., Los Angeles, Calif., by Thermoid of California, Inc., to Consolidated Products Co., Inc., 15 Park Row, New York 7, N. Y., dealer in chemical and rubber machinery, was announced last month by Martin I. Cowen, secretary of Consolidated Products. This plant is the former Grizzly Mfg. Co., which under Thermoid ownership had been producing rubber belting, brake linings, hose, and molded products on the Pacific Coast. The plant comprises about three acres of ground, with about 100,000 square feet of manufacturing space.

Negotiations are under way to reopen the plant under new ownership, Mr. Cowen reported, but should these plans fail, undoubtedly the machinery will be liquidated and distributed to other rubber factories, owing to the urgent demands for rubber machinery today. The property will then be offered to new interests who have already indicated their need of additional space in the industrial section of Los Angeles.

Witco Absorbs Dill Firm

Witco Chemical Co., 295 Madison Ave., New York 17, N. Y., announces the consolidation of the Marshall Dill organization, San Francisco, Calif., with the Pacific Coast activities of Witco. Established in 1900 as a sales organization covering western United States for domestic and foreign manufacturers, Marshall Dill during the intervening years has developed extensive export and import business. The Dill organization has offices and warehouses in San Francisco and Los Angeles, with additional outlets in Portland, Spokane, Seattle, and Denver. Mr. Dill has been elected a vice president of the Witco Chemical Co., in charge of the California division.

The acquisition of the Marshall Dill organization marks expansion on the West Coast of the distribution phase of Witco's chemical business in order to keep abreast of the company's manufacturing activities.

Marshall Dill was the first firm on the Pacific Coast to make a specialty of selling raw materials to the paint and varnish industries and extensively supply chemicals to the rubber, paint, printing ink, paper, and plastics industries. Until the war the company did a large export business with the Orient, maintaining branch offices in Shanghai, China, and Kobe, Japan.

Mr. Dill is a prominent West Coast business and civic leader. At present he is president of the Public Utilities Commission of San Francisco and a director of the International Chamber of Commerce and of the American Arbitration Association. He was consultant to the State Department at the San Francisco Peace Conference and is a past president of the San Francisco Chamber of Commerce. In 1940 he was president of the Golden Gate Exposition.

Sierra Rubber Co. is erecting a new factory building at 3706 E. 26th St., Los Angeles, Calif., to provide 2,500 square feet of floor space at an estimated cost of $12,500.

Seiberling Rubber Co., Akron, O., will erect a new warehouse on N.W. Pettygrove St., between 13th and 14th Aves., Portland, Ore., where Seiberling will establish its Pacific Northwest headquarters. The new structure will be of concrete, 100 by 200 feet, and use of the building will be acquired by the rubber company under a long-term lease. Offices and showrooms as well as warehousing facilities are provided for. Seiberling's present Portland quarters are at 325 N.W. 12th Ave.

W. J. Voit Rubber Co. prepared working plans in early May for construction of a second-story addition to its frame and stucco factory building at 1608 E. 25th St., Los Angeles, Calif., at a cost of $29,000.

CANADA

Dominion Rubber Announcements

Dominion Rubber Co., Ltd., Montreal, P. Q., through A. W. Hopton, vice president and general manager of the company's tire division, has announced a recent decision to increase the denier of rayon tire cords in heavy-duty tires from "1,100" to "2,200." This change is expected to result in tires having longer life and exhibiting a greater safety margin.

Several changes in sales representatives' personnel operating in the footwear territories of western Ontario, Manitoba, and Saskatchewan have been announced by J. L. McKillop, divisional sales manager for Dominion Rubber, footwear division, Winnipeg. R. J. Deakin has been appointed footwear division representative for northern Saskatchewan, with headquarters at Saskatoon; A. L. Ennis will cover the southern Saskatchewan area, with headquarters at Regina; W. J. Davidson, operating from Winnipeg, will represent the company in the Manitoba territory and, in addition, will be calling on the trade in western Ontario, along the Canadian Pacific Railway line. V. G. Hammond, who in the past was covering the southern Manitoba territory as well as part of Saskatchewan, will continue to look after the part of his territory in Manitoba and also will assume responsibility for covering western Ontario along the Canadian National Railway line to Fort Frances. Mr. Hammond will also be located at the Winnipeg branch office of Dominion Rubber.

Harry F. Rau, for five years traffic manager of Merchants Rubber Factory, footwear plant of Dominion Rubber, in Kitchener, Ont., has succeeded J. W. Kirkland as traffic manager of the company's Dominion tire factory in the same city, according to M. W. Thompson, general traffic manager of Dominion Rubber. Mr. Rau, who gained his shipping and traffic experience with the Grand Trunk-Canadian National Railways, has been associated with The B. F. Goodrich Co. and the Great Atlantic & Pacific Tea Co. in Detroit, Mich., before entering Dominion Rubber in 1935.

Mr. Kirkland had been associated with Dominion Rubber from 1914, having handled the shipping of the first tire to be made at what was then a new tire plant in Kitchener. He organized the shipping and stock room facilities and two years later was appointed traffic manager, a position he held until his retirement on April 30.

FINANCIAL

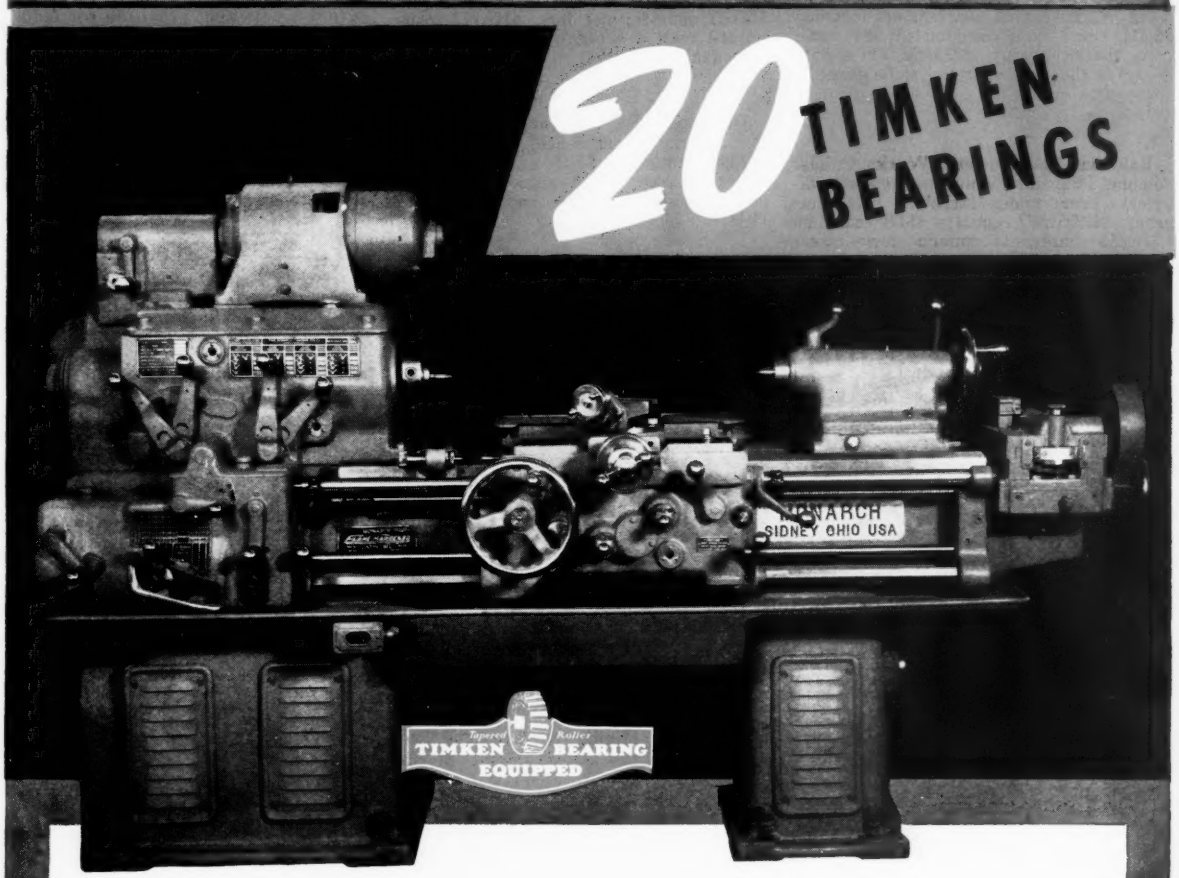
American Cyanamid Co., New York, N. Y. First three months, 1946: consolidated net income, $1,886,043, equal to 63¢ each on 2,707,026 common shares, against $1,648,285, or 54¢ a share, in the like period last year.

American Viscose Corp., New York, N. Y. First three months, 1946: net income, $3,457,417, equal to $1.83 a share, compared with $1,319,316, or 59¢ a share, in the 1945 period.

American Wringer Co., Inc., Woonsocket, R. I. For 1945: net income, $493,241, equal to $4.45 each on 110,833 capital shares, compared with $566,063, or $5.11 a share, in 1944.

American Zinc, Lead & Smelting Co., New York, N. Y., and wholly owned subsidiaries. Year end, March 31, 1946: net profit, $338,163, equal to 99¢ a share on $5 prior preferred stock, compared with $909,957, or 84¢ a common share,

Latest Monarch Lathe Development Uses



Designed to do work that heretofore has necessitated considerable special engineering — and to do it quickly, accurately and easily — the Monarch Moldmaker's Toolroom Lathe is the latest addition to the Monarch line.

Briefly, this machine solves the problem of shrinkage in making molds for producing accurate threaded parts for the plastics, molded rubber goods, powdered metal and porcelain industries, where the threads in the mold must have a longer lead than those in the finished parts.

It eliminates the necessity of making special change gears for each different type of mold. A lead screw varying mechanism — an inherent part of the lathe — makes it possible for the regular quick change gear box to be used for all lead screw variations. Thus the machine can quickly be set from one job to another.

Twenty Timken Tapered Roller Bearings applied throughout the lathe — including the mounting of the main spindle — help to assure the necessary precision, speed and endurance. You can have the bearing performance so long enjoyed by The Monarch Machine Tool Company by making sure that the trade-mark "TIMKEN" appears on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

for the corresponding period a year earlier.

Anaconda Wire & Cable Co., New York, N. Y. March quarter: net income, $6,233, equal to 1¢ each on 421,981 common shares, against $273,002 or 65¢ a share in the first quarter of the preceding year.

Baldwin Locomotive Works, Philadelphia, Pa., and wholly owned subsidiaries. Year ended March 31, 1946: net profit, $2,196,697, equal to $1.08 each on 1,875,553 shares of common stock, compared with $4,972,564, or $3.49 each on 1,378,751 common shares, for the preceding 12 months.

Belden Mfg. Co., Chicago, Ill. First quarter, 1946: net income, $122,566, equal to 46¢ each on 265,300 shares, compared with $118,373, or 49¢ each on 241,547 shares, in 1945.

Brown Rubber Co., Inc., Lafayette, Ind. For 1945: net income, $196,866, equal to 78¢ each on 251,100 shares, compared with $149,217, or 70¢ a share in 1944; current assets, $594,966; current liabilities, $200,622.

Columbian Carbon Co., New York, N. Y. First quarter, 1946: net income, including capital gains of $188,556, $1,267,783, equal to 79¢ each on 1,612,218 outstanding shares, contrasted with $953,730 a year earlier.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and subsidiaries. First quarter, 1946: net income, $28,925,013, equal to $2.43 a common share, against $18,796,997, or $1.52 a share, for the corresponding period a year ago.

Eagle-Picher Co., Cincinnati, O., and subsidiaries. Three months ended February 28, 1946: net profit, $443,299, equal to 50¢ a share, contrasted with $359,278, or 40¢ a share, in the corresponding period a year ago.

General Cable Corp., New York, N. Y. First quarter, 1945: net loss, $2,231,404, contrasted with a net income of $675,415 for the corresponding period of 1945.

General Electric Co., Schenectady, N. Y. For 1945: net profit, $56,540,555, equal to $1.96 a common share, contrasted with $50,845,719, or $1.76 a share, for 1944; net sales, $1,298,221,886, 4% under the 1944 figure.

General Motors Corp., Detroit, Mich. First quarter, 1946: net loss, $38,419,218, contrasted with a net profit of $47,935,174, or $1.09 a common share, in the like period last year.

Hewitt-Robins, Inc., Buffalo, N. Y. March quarter: net loss, $417,772, contrasted with a profit of $129,420 in the first quarter of 1945.

Industrial Rayon Corp., Cleveland, O. March quarter: net earnings, $1,752,847, equal to $1.15 a share of the new common stock, against $342,607, or 23¢ a share, in the first quarter of 1945.

I. B. Kleinert Rubber Co., New York, N. Y., and subsidiaries. For 1945: net income, $236,848, equal to $1.46 a share, against $276,462, or $1.70 a share, in 1944.

Johnson & Johnson, New Brunswick, N. J., and subsidiaries. For 1945: net income, $3,058,279, equal to $3.05 a share, contrasted with $3,028,049, or $3.22 a share, in 1944.

Lee Rubber & Tire Corp., Conshohocken, Pa., and subsidiary. Six months to April 30: net profit, $1,146,105, equal to $4.74 a share, against $776,028, or $3.21 a share, for the similar period of the previous year; net sales, $14,493,097, against $15,250,583.

Minnesota Mining & Mfg. Co., St. Paul, Minn., and subsidiaries. March quarter: net income, $1,471,535, or 75¢ each on 1,951,530 shares.

Norwalk Tire & Rubber Co., Norwalk, Conn. Six months ended, March 31, 1946: net profit, $220,196, equal to $1.01 a share, against $116,987, or 50¢ a share, for corresponding period of the previous year; net sales, $5,160,514, compared with $4,399,269.

Phillips Petroleum Co., Bartlesville, Okla., and subsidiaries. First quarter, 1946: net income, $4,244,933, equal to 86¢ a share, compared with $9,145,298, or $1.86 a share, in the corresponding period a year ago; provision for federal income taxes, $1,297,800, against $3,195,000.

Pittsburgh Plate Glass Co., Pittsburgh, Pa. First quarter, 1946: net income, $3,330,825, equal to 37¢ a share, compared with $3,416,894, or 39¢ a share, in the 1945 quarter; net sales, $37,177,894, against $38,743,806.

Raybestos-Manhattan, Inc., Passaic, N. J., and domestic subsidiaries. First quarter, 1946: net profit, $224,548, equal to 36¢ a share, against $332,133, or 53¢ a share, for the corresponding period of 1945.

Rome Cable Corp., Rome, N. Y. Year ended March 31, 1946: net profit, $454,973, equal to $2.39 each on 189,830 shares, against $436,653, or $2.30 a share, in the preceding fiscal year; reserve for contingencies, $56,000, against $50,000.

Skelly Oil Co., Kansas City, Mo. First quarter, 1946: net income, $1,628,302, equal to $1.65 each on 981,348 common shares, compared with, $1,767,810, or $1.80 a share, a year earlier.

Thermoid Co., Trenton, N. J., and subsidiaries. March quarter: net profit, $35,210, equal to 1¢ a common share, against $287,742, or 44¢ a share, in the 1945 quarter.

Timken Roller Bearing Co., Canton, O. First quarter, 1946: operating loss, $3,030,951, contrasted with a net income of $1,247,452, or 50¢ a share, in the corresponding quarter of 1945.

(*Continued on page* 428)

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Armstrong Rubber Co.	4¾% Pfd.	$0.59⅜ q.	July 1	June 19
Armstrong Rubber Co.	A & B	0.15 q.	July 1	June 19
Brunswick-Balke-Collender Co.	Com.	0.25	June 15	June 1
Crown Cork & Seal Co., Ltd.	Com.	0.50 q.	Aug. 15	July 15
Crown Cork International	"A"	0.40	July 1	June 17
Dewey & Almy Chemical Co.	Com.	0.35	June 15	May 31
Dunlop Tire & Rubber Goods Co., Ltd.	5% Cum. Pfd.	2½% S.	June 29	June 15
Dunlop Rubber Co., Ltd.	ADR	2% extra	July 2	May 18
Dunlop Rubber Co., Ltd.	ADR	10% final	July 10	May 24
Faultless Rubber Co.	Com.	2.25	June 25	June 15
Firestone Tire & Rubber Co.	Pfd.	1.12½ q.	June 1	May 15
Flintkote Co.	Com.	0.15	June 10	May 27
Flintkote Co.	$4 Pfd.	1.00	June 15	June 1
General Tire & Rubber Co.	Com.	0.25 q.	May 31	May 21
B. F. Goodrich Co.	Pfd.	1.25 q.	June 29	June 14
B. F. Goodrich Co.	Com.	0.75 q.	June 29	June 14
Goodyear Tire & Rubber Co.	Com.	1.00	July 2	June 10
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	0.625 q.	July 2	June 10
Hewitt Rubber Co.	Com.	0.25 q.	June 15	May 28
I. B. Kleinert Rubber Co.	Com.	0.25	June 12	May 31
Johnson & Johnson	4% 2nd Pfd. "A"	1.00 q.	Aug. 1	July 12
Mansfield Tire & Rubber Co.	Com.	0.25 q.	June 20	June 10
Mansfield Tire & Rubber Co.	Pfd.	0.30 q.	July 1	June 20
Minnesota Mining & Mfg. Co.	Com.	0.25	June 10	May 20
Rome Cable Corp.	Com.	0.15 q.	June 27	June 10
Rome Cable Corp.	Com.	0.25 extra	June 27	June 10
Seiberling Rubber Co.	4½% Pr. Pfd.	1.075 unit	July 1	June 15
Seiberling Rubber Co.	Pfd. "A"	1.25 q.	July 1	June 15
Thermoid Co.	Com.	0.15 q.	June 15	June 5
United Elastic Co.	Com.	0.50 q.	June 10	May 1
United States Rubber Co.	Com.	0.75	June 10	May 20

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A Complete Line of Approved Compounding Materials

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CHEMICAL MANUFACTURERS

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Patents and Trade Marks

APPLICATION

United States

2,394,611. **Electric Cable Including a Hollow Core of Helically Wound Metallic Strip and, Dividing the Interior of the Core into Water-Tight Sections, Plugs in the Form of Hollow Soft Rubber Spheres Containing Gas.** L. F. Hickernell, Irvington, and J. E. Talbott, Dobbs Ferry, assignors to Anaconda Wire & Cable Co., New York, all in N. Y.

2,394,687. **In a Syringe with an Adjustable Piston Construction, an Axially Compressible and Radially Expansible Gasket Mounted on the End of the Piston Rod.** G. N. Hein, San Carlos, Calif.

2,394,705. **Pump Shoes with Stretchable Sections.** H. S. Lyness, Lynn, Mass., assignor to United Shoe Machinery Corp., Flemington, N. J.

2,394,722. **Nursing Bottle Open at Both Ends and Having a Rear Closure Cap Including a Cap Body and Forwardly Extending Hollow Valve; Cap Body and Valve Are Resilient, Flexible, and Extensible.** M. Sloane, Hartford, Conn.

2,394,783. **Heavy Duty Friction Element for Vehicular Brakes Including a Mass of Friction Material, Inert Filler, and a Friction-Modifying Agent Bonded with a Compound Consisting of Butadiene-1,3 Acrylonitrile Copolymer and a Heat-Resistant Phenolic Aldehyde Resin.** E. C. Keller, Detroit, and R. E. Spokes, Ann Arbor, both in Mich., assignors to American Brake Shoe Co., a corporation of Del.

2,394,800. **In a Hydraulic Rotary Swivel, the Combination of a Rotary Member, a Stationary Member, and between Them, Packing Means Including a Resilient Packing Ring of V-Shaped Cross-Section.** D. A. Murphy, Torrance, Calif., assignor to National Supply Co., Pittsburgh, Pa.

2,394,888. **Valveless Suction Apparatus Including Flexible Tubing.** J. A. Betts, Easton, Pa.

2,394,900. **Patent Leather Shoe Made from Soft, Flexible, Waterproof, Oil-Resisting Non-Cracking Sheet Plastic.** K. I. Clisby, Montclair, N. J.

2,395,006. **Signal Balloon.** A. Y. Leslie, Detroit, Mich.

2,395,107. **In a Sealing Ring Including a Tubular Shell with End Portions of Different Diameters, a Rubber Ring with an End Portion Fitting within the Large End of the Shell, and an Opposite End Forming an Expansible Shaft Engaging Band within the Smaller Portion of the Shell, and between Band and Shell a Radially Compressible Cushioning Band of a Softer Rubber Than That of the Ring.** H. M. Dodge, Wabash, Ind., assignor to General Tire & Rubber Co., Akron, O.

2,395,143. **Elastic Bushings in Resilient Mount for Aircraft.** R. H. Prewitt, Lansdowne, Pa., assignor to Kellett Aircraft Corp., a corporation of Del.

2,395,149. **In a Parenteral Bottle Including an Open-Mouthed, Hollow Container Portion, a Plug of Pierceable Rubber to Seal the Open Mouth.** J. E. B. Shaw, Chicago, Ill.

2,395,239. **A Pair of Segmental Inflatable Elements in a Pressure Fluid Operated Clutch.** F. L. White and L. O. McLean, assignors to Osgood Co., all of Marion, O.

2,395,243. **In a Cylinder Head Gasket of the Metal Clad Type Having Openings Including an Oil Hole, a Resilient Rubber-Like Grommet Mounted in the Oil Hole.** A. J. Aukers, assignor to Victor Mfg. & Gasket Co., both of Chicago, Ill.

2,395,256. **In Apparatus for the Liquid Treatment of Cakes of Artificial Thread, in Combination a Tubular Perforated Holder and a Soft Permeable Sheath of Elastic Material, Such as Rubber, Surrounding the Holder.** D. C. F. Devos, Birdingbury, assignor to Courtaulds Ltd., London, both in England.

2,395,257. **For Joining Pieces of Pile Floor Coverings, a Tape of Strong Open-Mesh Fabric, One Side of Which Has a Film of a Cellulosic Compound to Prevent Slipping, While the Other Side Has a Coating of Polyvinyl Plastic.** A. T. Dildilian, Suffield, assignor to Bigelow-Sanford Carpet Co., Inc., Thompsonville, both in Conn.

2,395,266. **A Buoyant Element Including an Impermeable Outer Casing Enclosing a Body of Filling Consisting of a Light Weight, Finely Divided Water-Insoluble Solid Substance.** H. A. Gardner, Chevy Chase, Md.

2,395,294. **Composition Sheet for Shoe Soles Made from Scrapped Golf Ball Cover Stock, Refined Balata, and Ground Cork.** W. M. Quinn, Chicopee, Mass.

2,395,298. **Respirator.** H. L. Shock, Jr., assignor to Pulmosan Safety Equipment Corp., both of Brooklyn, N. Y.

2,395,301. **In Making Filter Members of Fibrous Material and Fine Particles of Inert Material, the Use of a Synthetic Resin as Dispersing Agent for the Inert Material.** E. C. Sloan, assignor to J. B. Hawley, both of Geneva, Ill.

2,395,346. **In Suspension Saddles for Bicycles, a Saddle Top of Loosely Woven Cords Embedded in a Layer of Resilient Rubber Cured on the Cords.** F. W. Schwinn, Chicago, Ill.

2,395,383. **In a Wheel Device, a Pneumatic Tire and Means to Prevent the Tire from Sinking into Soft Earth or Mud.** F. L. White, Marion, O.

2,395,556. **Fuel Tank Including an Uncured Rubber Container Having a Layer of Synthetic Rubber Insoluble to Gasoline Cemented to Its Inside Surface.** K. J. Kopplin, Normandy, assignor to F. Burkart Mfg. Co., St. Louis, both in Mo.

2,395,645. **For a Billiard Table, a Cushion Including an Elongated Body of Triangular Cross Section Having Triangular Sections of Sheet Rubber Secured Together to Form the Sides of the Body.** T. Sato, Honolulu, Hawaii.

2,395,675. **In Curing and Hardening a Cast Ball of Hydrophilic Phenol-Formaldehyde Resin, the Use of an Elastic Jacket in Which to Enclose the Ball.** H. J. Luth, Muskegon, Mich., assignor to Brunswick-Balke-Collender Co., Chicago, Ill.

2,395,692. **Rubber Press Head in a Flanging Press.** W. H. Snow, Manhattan Beach, and J. D. Brengman, West Los Angeles, assignors to North American Aviation, Inc., Inglewood, all in Calif.

2,395,700. **For Carrying a Lens Blank or the Like to a Grinding or Polishing Operation, a Holder Including a Rigid Body Portion and a Support Member of Elastic Material Shaped to Provide Suction-Type Mounting.** V. Walker, Fort Erie, Ont., Canada, assignor to AlnCin, Inc., Buffalo, N. Y.

2,395,705. **In a Shaft Seal Having a Pair of Bearing Rings, Resilient Seals Supporting the Latter.** R. Wool, New York, N. Y.

2,395,785. **A Distributer Hub Including an Aluminum Core, Coated with Iron, an Intermediate Layer of Highly Elastic Hard Rubber and an Outer Cover of Relatively Inelastic Vulcanite.** E. Klingler, Korntal, O. Knapp, Flacht, Kreis Leonberg, and M. Lutz, Stuttgart-Weilimdorf, all in Germany; vested in the Alien Property Custodian.

2,395,935. **Corrosion-Resistant Packing Including a Core Formed from a Strip of Polyvinylidene Chloride.** R. E. Morgan and P. N. Curry, assignors to Durametallic Corp., all of Kalamazoo, Mich.

2,395,949. **Vibration Absorbing Pad Including an Outer Cover of Synthetic Rubber Compound and Supporting Members of Synthetic Rubber on the Interior thereof.** R. D. Wilkins, Oak Park, Ill., assignor to Western Felt Works, Chicago, Ill.

2,395,963. **In a Seal for a Joint between an Inner Shaft Member and an Outer Sleeve Member Mounted on the Shaft Member for Relative Oscillatory Movement, a Tube of Rubber-Like Material.** D. Fergusson, assignor to J. Cunningham Son & Co., all of Rochester, N. Y.

2,395,993. **Reenforced Resilient Shoe Heel.** F. Cleve, Jr., Kansas City, Mo.

2,396,005. **For Sealing the Walls of a Receptacle, a Device Including a Rubber-Like Ring Having a Body of Circular Cross-Section.** B. Gross and L. W. Cornwall, both of San Diego, assignors to Rohr Aircraft Corp., Chula Vista, both in Calif.

2,396,035. **Stopper Adapted to Close an Opening in a Wall, Including a Diaphragm of Elastic Material.** H. J. Billing, Ashow, and G. A. G. Fazekas, Coventry, assignors to Simmonds Development Corp., Ltd., London, all in England.

2,396,078. **Pipe Coupling Including Two Flanged Sections and Having Elastic Material in the Space between the Sections and Flanges and Bonded thereto.** W. A. G. Box, Maidenhead, England.

2,396,153. **In Apparatus for Absorbing or Transmitting Power, a Pair of Rotatable Members, One of Which Has Spaced Concentric Ribs of Resilient Material and Flexible Projections Projecting from the Ribs into the Spaces therebetween; the Projections Are Engageable by Non-Yielding Projections on the Second Rotatable Member.** H. J. Butler, Sutton Coldfield, assignor to Dunlop Rubber Co., Ltd., London, both in England.

2,396,212. **Pneumatic Collapsible Boat.** A. N. Spaniel, Princeton, N. J.

2,396,269. **Buoyant Electrode Including a Buoyant Core Element around Which Are Uninsulated Conducting Wires, and a Sheath of Conducting Rubber Surrounding and Contacting the Wires.** F. H. Gooding, Lodi, assignor to Okonite-Callender Cable Co., Inc., Paterson, both in N. J.

2,396,272. **Buoyant Electric Cable Including a Center of Cells Enclosed in Metal, Spacers of Elastic Material, and a Sheath of Rubber.** F. H. Gooding, Lodi, and P. L. Sipp, Jr., Ridgewood, assignors to Okonite-Callender Cable Co., Inc., Paterson, both in N. J.

2,396,273-274. **Buoyant Electric Cable.** H. L. Beede, Fort Lee, assignor to Okonite-Callender Cable Co., Inc., Paterson, both in N. J.

2,396,313. **Shoe Part Having a Single Sprayed Temporary Protective Coating Including a Vinyl Resin and a Plasticizer therefor Formed in Situ.** J. J. Brophy, Salem, Mass., assignor to United Shoe Machinery Corp., Flemington, N. J.

2,396,353. **In a Joint Assembly, Inner and Outer Annular Members and a Radially Loaded Resilient Block between These Members.** A. Venditty, Detroit, Mich., assignor to Thompson Products, Inc., Cleveland, O.

2,396,381. **Soft Rubber Supporting Cushion in a Desk Pad Holder.** R. P. Magnenat, assignor to Waterbury Cos., Inc., both of Waterbury, Conn.

2,396,386. **A Piston for Use in a Pressure Differential Operated Motor Including a Cylinder Member; the Piston Has Two Flexible Seal Members of Reenforced Synthetic Rubber.** E. R. Price, assignor to Bendix Aviation Corp., both of South Bend, Ind.

2,396,413. **A Rivet Bucker for Application within a Tubular Body, Including a Frame Open at One End, and in the Frame an Expansible Bag-Like Body.** E. F. Egger, Seattle, Wash.

2,396,482-483. **Elastic Fabric.** S. W. Alderfer, assignor of one-half to E. D. Andrews, both of Akron, O.

2,396,494. **Non-Rigid Airship.** L. H. Donnell, Chicago, Ill., and E. L. Shaw, assignors to Wingfoot Corp., both of Akron, O.

2,396,565. **Two-Ply Gusseted Bag, the Inner Ply of Which is Composed of Impervious Heat-Sealable, Synthetic Material.** C. E. Gardner, Cuyahoga, Falls, assignor to Wingfoot Corp., Akron, both in O.

2,396,579. **Vehicle Suspension Including Springing Means of Resilient Rubber-Like Material.** A. S. Krota, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,396,633. **Butyl Rubber Package.** I. M. Bernstein, assignor, by mesne assignments, to H. D. Roosen Co., Inc., both of Brooklyn, N. Y.

2,396,702. **Submarine Cable with a Rubber Protecting Cover and a Rubber Wrapping.** E. A. Johnson, Chevy Chase, Md., and R. MacHenry, Washington, D. C.

2,396,712. **Filter Structure Having a Covering of Partly Coalesced Filamentary Material of a Copolymer of Vinyl Acetate and Vinyl Chloride.** W. G. Luttge, Brooklyn, and E. G. Mesthene, Woodside, both in N. Y., assignors to American Viscose Corp., Wilmington, Del.

2,396,725. **Electrical Connector for Connecting Electrical Conductor Wires, Including a Body of Rubber-Like Flexible Insulating Material.** G. C. Thomas, Jr., assignor to Thomas & Betts Co., both of Elizabeth, N. J.

2,396,771. **Fountain Pen.** D. H. Brinson, Sr., Annapolis, Md.

2,396,836. **In a Support for Metallic Conduits, Opposed Elongated Cushions of Insulation Material.** H. R. Ellinwood, assignor to Adel Precision Products Corp., both of Burbank, Calif.

2,396,837-838. **Conduit Supporting Clip Including Cushions of Resilient Insulation Material.** H. R. Ellinwood, assignor to Adel Precision Products Corp., both of Burbank, Calif.

2,396,872. **Connector for Flexible Conductor Cables Including a Resilient Rubber-Like Body.** J. B. Miller, Webster Groves, and J. H. Simpson, Maplewood, assignors to Mines Equipment Co., St. Louis, all in Mo.

2,396,925. **Cushion Strip of Resilient Insulation Material in a Conduit Clip.** E. M. Morehouse, Tujunga, Calif., assignor to Adel Precision Products Corp., a corporation of Calif.

2,397,024. **In a Wheel Structure, a Multi-Part Cover Assembly Having a Central Circular Hub Cap Simulating Member Formed from Synthetic Plastic Material.** G. A. Lyon, Allenhurst, N. J.

Dominion of Canada

433,796. **In a High-Pressure Joint, a Mass of Flexible, Distortable Sealing Material.** Chicago Forging & Mfg. Co., Chicago, Ill., assignee of E. E. Howe, Royal Oak, Mich., both in the U. S.A.

433,808. **In the Suspension of a Vehicle Including Running Gear and a Frame, the Combination of Mounting Pins Secured to the Running Gear and to the Frame, a Stabilizer Rod Extending between the Mounting Pins, and a Split Rubber Bushing between Stabilizer Rod and Mounting Pins.** Firestone Tire & Rubber Co., assignee of R. W. Brown, both of Akron, O., U.S.A.

433,833. **Flexible, Transparent Adhesive Tape**

SANTOCURE

accelerator for rubber vulcanization

excellent in natural rubber

The superior performance of Santocure* in synthetic rubber, and its wide use throughout the war years, may have obscured the fact that Santocure does the same excellent job of curing natural rubber. Through the choice of secondary accelerators, you can get optimum cures of rubber stocks under practically all plant conditions . . . Santocure also performs well in black stocks.

Available to everyone interested in accelerators and antioxidants are . . . (1) Continuing research studies on many rubber products, and . . . (2) Literature describing the properties and applications of Santocure. Write MONSANTO CHEMICAL COMPANY, Rubber Service Department, Second National Building, Akron, Ohio.

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SERVING INDUSTRY . . . WHICH SERVES MANKIND

or Sheet Stretchable at Least 25%, Adapted for Use in Surfacing Outdoor Signs to Produce Reflex Reflection of Incident Light. Minnesota Mining & Mfg. Co., St. Paul, assignee of P. V. Palmquist, New Canada Township, both in Minn., U.S.A.

433,834. **In an Insulation Window Installation, a Tube of Resiliently Compressible Material with Filter Casing Inserted in the Tube.** Robert Mitchell Co., Ltd., assignee of E. Clark, both of Montreal, P. Q.

433,841. **Resilient Cushioning Means for a Mounting for Spinning and Twister Spindles.** Saco-Lowell Shops, Boston, Mass., assignee of C. M. Neal, Biddeford, Me., U.S.A.

433,921. **Goggles with a Frame, the Inner Part of Which Is of Molded Sponge Rubber, While the Outer Part Includes an L-Shaped Molding of Flexible Rubber Having Its Vertical Face Reenforced by Rubberized Fabric.** Dunlop Tire & Rubber Goods Co., Ltd., assignee of F. G. Reid, both of Toronto, Ont.

433,928. **Sealing Structure.** B. F. Goodrich Co., New York, N. Y., assignee of C. P. Krupp, Akron, O., both in the U.S.A.

433,946. **Inking Pad Including a Resilient Spongy Liquid-Absorbing Body with a Narrowly Punctured Thin Elastic Skin Otherwise Impervious to Liquids.** Rivet-O Mfg. Co., assignee of C. C. Harris, both of Orange, Mass., U.S.A.

433,988 **Road Roller Including Resilient Tire-Equipped Wheels.** J. H. Ganley, St. Paul, Minn., U.S.A.

433,994. **In a Wheel Structure, a Wheel Cover of Resilient, Plastic Material.** G. A. Lyon, Allenhurst, N. J., U.S.A.

433,996-997. **In a Wheel Structure, a Cover Including an Annular Trim Ring of Plastic Material.** G. A. Lyon, Allenhurst, N. J., U.S.A.

434,003. **Nursing Bottle with Nipple Having a Disk-Like Base Seating on the Open End of the Bottle.** D. G. Paxman, Oakland, Calif., U.S.A.

434,036. **Sealing Ring for the Glass Cover of an Instrument Case.** Bendix Aviation Corp., South Bend., Ind., assignee of J. E. Bevins, Hackensack, N. J., U.S.A.

434,063. **Ignition Distributer Housing Including Melamine as a Component Part of Its Surface.** Ford Motor Co. of Canada, Ltd., Windsor, Ont., assignee of E. Zoerlein, J. L. McCloud, and J. A. Mickey, all of Dearborn, Mich., U.S.A.

434,065. **Cement for Adhering Rubbery Material to Aluminum, Consisting of Chlorinated Rubber, a Finely Divided Metal, and a Solvent.** B. F. Goodrich Co., New York, N. Y., assignee of D. V. Sarbach, Cuyahoga Falls, O., both in the U.S.A.

434,092. **In a Fuel System Including a Fuel Tank, a Bag of Self-Sealing Material.** Thompson Products, Inc., Cleveland, O., assignee of W. H. Curtis, Los Angeles, Calif., and R. R. Curtis, Dayton, O., all in the U.S.A.

United Kingdom

575,404. **Water-Tight Bags.** United States Rubber Co.

575,474. **Rubber Soles for Sports Shoes.** A. Abbey. (A. G. R. & E. Huber, Schweizerische Kabel-Draht-und Gummiwerke).

575,497. **Damping Arrangements for Vehicle Suspension Systems.** J. A. Petrie.

575,613-615. **Inflatable Dinghies.** P. W. L. Williams and R. F. D. Co., Ltd.

575,678. **Adhesive Tapes.** Durex Abrasives, Ltd., and J. W. Fowler.

575,930. **Elastic Pad as Employed on Molding Presses, to Form, in Effect, a Female Die Surface into Which Pattern Pieces May Be Pressed During the Molding Process.** Hydraulic Engineering Co., Ltd., and A. R. Mangnall.

575,988. **Vibration Suppressing Mountings.** United Aircraft Corp.

576,108. **Inflatable Dinghies.** Elliot Equipment, Ltd., and K. G. Hann.

576,111. **Electric Insulated Wires and Cables.** W. T. Henley's Telegraph Works Co., Ltd., H. A. Tunstall, and W. F. O. Pollett.

576,124. **Puncture Sealing Walls for Fuel Tanks, Etc.** United States Rubber Co.

576,173. **Flexible Shock Absorbing Mountings.** Silentbloc, Ltd., and P. C. Hutton.

576,203. **Shock Absorbing Bearing for Time Indicators.** E. Morf.

576,206. **Sealing Device for Shafts.** Dunlop Rubber Co., Ltd., and H. J. Butler.

576,283. **Closure for a Bottle, Tube, or Other Open-Ended Object.** Wingfoot Corp.

PROCESS

United States

2,394,762. **Elastic Coil Cables Rendered Elastic by Having a Covering of Rubber-Like Material.** P. C. Geraty, assignor, by mesne assignments, to Kellogg Switchboard & Supply Co., both of Chicago, Ill., and to R. D. Collins, Beverly Hills, Calif.

2,394,133. **Improvement in Cementing Outsoles to Shoes.** J. A. Mahoney and W. S. Anderson, assignors to Shoe Press Corp., all of Philadelphia, Pa.

2,394,987. **Forming a Fibrous Rubber Base from Ground Rubber Bound Fabric of Tire Carcass Stock.** G. C. Berryman, Los Angeles, Calif.

2,396,482-483. **Elastic Fabric.** S. W. Alderfer, assignor of ½ to E. D. Andrews, both of Akron, O.

2,396,505. **Grinding Rubber-Like Articles.** C. Grumper, West Haven, assignor to Bridgeport Safety Emery Wheel Co., Inc., Stratford, both in Conn.

2,396,629. **Polytetrafluoroethylene Articles.** J. Alfthan and J. L. Chynoweth, both of New York, N. Y., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,396,824. **Diaphragm.** L. R. Burroughs, assignor to Electro-Voice Mfg. Co., both of South Bend, Ind.

Dominion of Canada

433,771. **Seamless Collapsible Tube of Plastic Material.** Betts & Co., Ltd., assignee of E. Stather-Dunn and F. M. Menheneott, all of City Road, London, England.

433,922. **Belting.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of F. W. Warren, Manchester, England.

434,065. **Adhering Rubbery Material to Metal.** B. F. Goodrich Co., New York, N. Y., assignee of D. V. Sarbach, Cuyahoga Falls, O., both in the U.S.A.

434,066. **Footwear Partly of Rubber and Partly of Synthetic Plastic Material.** B. F. Goodrich Co., New York, N. Y., assignee of C. A. Riley, Melrose, Mass., both in the U.S.A.

434,075. **Method of Drying a Film of a Coating Composition Including a Solution in a Solvent of Two Polar Resins Having a Dielectric Constant Greater Than 3.** F. H. Levey Co., Inc., assignee of M. Wilson, both of New York, N. Y., U.S.A.

United Kingdom

575,292. **Application of Insulating Materials to Electric Cables.** Standard Telephones & Cables, Ltd., and A. J. Maddock.

575,715. **Film, Sheet, or Ribbon of Thermoplastic Material.** A. P. Thurston (Owens-Corning Fiberglas Corp.).

576,068. **Electric Cables.** British Insulated Cables, Ltd., A. K. McKerrow, and E. W. Mills.

576,102. **Impregnation of Synthetic Linear Polyamide Filaments with One-Stage Phenol-Formaldehyde Resins.** L. Lebeb and Imperial Chemical Industries, Ltd.

576,164. **Cementing Polymethyl Methacrylate Surfaces.** J. S. Byers, A. Burness, and Imperial Chemical Industries, Ltd.

CHEMICAL

United States

2,394,542-543. **As Textile Printing Composition, an Emulsion Including a Solution of a Synthetic Rubber.** D. M. Gans, assignor to International Chemical Corp., both of New York, N. Y.

2,394,550. **For a Tubular Ferrous Electrode for Underwater Cutting, a Coating Including a Base of Polyvinyl Chloride, an Arc Stabilizing Material, and Iron Oxide.** C. D. Jensen, Annapolis, Md.

2,394,560. **Hard Resin Produced from an Aromatic Compound of the Class Consisting of Aromatic Hydrocarbons Having at Least One Incompletely Substituted Benzene Ring and Having No Alkyl Side Chains of More Than Five Carbon Atoms, Reacted with a Chlorinated Paraffin Wax in the Presence of a Friedel-Crafts Catalyst.** F. P. Otto and O. M. Reiff, both of Woodbury, N. J., assignors to Socony-Vacuum Oil Co., Inc., a corporation of N. Y.

2,394,564. **Composition Formed by Heating Chlorinated Petroleum Wax with a Phenol in the Presence of a Friedel-Crafts Catalyst. Dechlorinating the Resultant Complex Condensation Product, and Then Adding Sulfur and Vulcanizing the Product.** O. M. Reiff and I. D. Zech, Woodbury, N. J., assignors to Socony-Vacuum Oil Co., Inc., a corporation of N. Y.

2,394,581. **Heating a Polymer of Tetrafluoroethylene in the Presence of Chlorine at a Temperature of 630° C. and Separating the Reaction Products.** A. F. Benning, Woodstown, and F. B. Downing, Carneys Point, both in N. J., and I. D. Park, assignors to Kinetic Chemicals, Inc., both of Wilmington, Del.

2,394,582. **Ethers of Hydroxydihydronorpolycyclopentadiene.** H. A. Bruson, assignor to Resinous Products & Chemical Co., both of Philadelphia, Pa.

2,394,583. **The Thiocyanoacetate of 3,5-Endoethylene Hydroxycyclopentanoindane.** H. A. Bruson, assignor to Resinous Products & Chemical Co., both of Philadelphia, Pa.

2,394,584. **The Thiocyano Acetic Acid Ester of Hydroxydihydronordicyclopentadiene.** H. A. Bruson, assignor, by mesne assignments, to Resinous Products & Chemical Co., both of Philadelphia, Pa.

2,394,597. **Aliphatic Diisocyanate.** J. B. Dickey, J. M. Straley, and T. E. Stanin, assignors to Eastman Kodak Co., all of Rochester, N. Y.

2,394,616. **Liquid Coating Composition for Containers to Prevent Adherence thereto of Tacky High Molecular Weight Polymerization Products of Iso-Mono-Olefins and Poly-Olefins, Including a Low-Temperature Copolymer of Isobutylene and Butadiene, a Petroleum Wax, Dixie Clay, Oleic Acid, Triethanolamine, a Petroleum Sulfonate Soap, and Water, Compounded Together to Form an Emulsion-Like Mass.** F. Knoth, Jr., Linden, and M. A. Pavlick, Elizabeth, both in N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,394,625. **Manufacture of a Conjugated Diolefin of not More Than Five Carbon Atoms per Molecule from the Corresponding Paraffin.** M. P. Matuszak, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

2,394,641. **Polymerization of Cyclopentadiene.** F. J. Soday, Swarthmore, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,394,644. **Manufacture of Alpha-Chloro-Beta-Hydroxy Propionitrile by the Action of Gaseous Chlorine on Acrylonitrile in the Presence of Water.** K. H. W. Tuerck, Banstead, and J. H. Liechtenstein, London, both in England, assignors to Distillers Co., Ltd., Edinburgh, Scotland.

2,394,674. **Producing Acetophenone by Passing a Mixture of Styrene Halohydrin Vapor and Steam into Contact with a Basically Reacting Surface Catalyst.** W. S. Emerson, Dayton, O., assignor to Monsanto Chemical Co., a corporation of Del.

2,394,678. **Obtaining Low Sulphur Diisobutylene.** M. Frankel, Keesler Field, Miss., and M. S. Agruss, Chicago, Ill., assignors to Pure Oil Co., Chicago, Ill.

2,394,756. **Producing Rubber-Like Products by Polymerizing a Mixture Including Butadiene and Methyl Isopropenyl Ketone in Aqueous Emulsion, in the Presence of an Agent Which Inhibits the Polymerization of the Methyl Isopropenyl Ketone at Room Temperature.** R. R. Dreisbach, assignor to Dow Chemical Co., both of Midland, Mich.

2,394,815. **Composition Including Natural or Synthetic Rubber and a Monohydric Alcohol Ester of a Tetrahydrophthalic Acid.** F. J. Soday, Swarthmore, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,394,816. **Coating Composition Including the Hydrogenation Product of at Least One of a Group Consisting of Resinous Polymerized Cyclopentadiene, Resinous Polymerized Methyl Cyclopentadiene, and Resinous Copolymer of Cyclopentadiene and Methyl Cyclopentadiene Mixed with a Sulfur-Containing Rubber Vulcanizing Agent.** F. J. Soday, Baton Rouge, La., assignor to United Gas Improvement Co., a corporation of Pa.

2,394,862. **Obtaining Reaction Products of 1,3-Dioxolane Containing the Structure —$CH_2OCH_2CH_2O$—.** D. J. Loder and W. F. Gresham, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,394,910. **A 1,3-Dioxolane-Alkylene Oxide Interpolymer.** W. F. Gresham, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,394,912. **Halogen Substituted Acetonitriles.** I. Hechenbleikner, Stamford, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,394,952. **Improving the Processing Characteristics of Butadiene-Styrene Interpolymers by Intimately Incorporating a Polyvalent Metal Salt of a Terpene Mercaptan.** J. R. Vincent, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,394,960. **Interpolymerizing Ethylene with Methyl Methacrylate.** H. S. Young, Fairville, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,394,962. **Reacting in the Presence of a Strongly Basic Quaternary Ammonium Hydroxide, Acrylonitrile and an Ester of Acetoacetic Acid.** H. A. Bruson, assignor to the Resinous Products & Chemical Co., both of Philadelphia, Pa.

2,395,016. **Production of a Diolefin of Four to Five Carbon Atoms per Molecule from the Corresponding Normal Paraffin.** W. A. Schulze and J. C. Hillyer, both of Bartlesville, Okla., assignors to Phillips Petroleum Co., a corporation of Del.

2,395,017. **Polymerizing in Aqueous Emulsion a Mixture of Butadiene, Acrylonitrile, and an**

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2,395,050. **Reacting Sulphur Dioxide with a Conjugated Diolefin to Produce a Crystalline Sulfone of the Latter.** G. W. Hooker, L. R. Drake, and S. C. Stowe, assignors to Dow Chemical Co., all of Midland, Mich.

2,395,057. **Cyclic Process for Making Butadiene.** J. L. Marsh and M. E. Hitchcock, South Charleston, W. Va., assignors to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

2,395,058. **Production of Butadiene.** W. J. Mattox, assignor to Universal Oil Products Co., both of Chicago, Ill.

2,395,070. **Synthetic Rubber Composition Including a Rubbery Polymer of a Butadiene-1,3 Hydrocarbon in Which Is Incorporated a Chlorine Containing Ester of Metacarbonic Acid with a Monohydric Alcohol.** D. V. Sarbach, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,395,071. **Adhering Rubbery Materials to Each Other by Placing Together an Unvulcanized Butadiene Rubber and Another Unvulcanized Synthetic Rubber, at Least One of Which Contains a Chlorine-Containing Ester of Carbonic Acid with a Monohydric Alcohol, and Vulcanizing the Assembly.** D. V. Sarbach, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,395,076. **Coating Composition Including Drying Oil and Hydrocarbon Resin Polymer from the Group of Heat Resin Polymer and Catalytic Resin Polymer of Polymerizable Hydrocarbons Contained in a Hydrocarbon Oil Which Has Been Physically Separated from Tar Produced in the Vapor Phase Pyrolysis of Petroleum Oil.** F. J. Soday, Swarthmore, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,395,086. **Finished Isobutylene Polymer Product.** C. F. Van Gilder, Roselle, and H. C. Evans, Cranford, both in N. J., assignors, by mesne assignments, to Jasco, Inc., a corporation of La.

2,395,240. **Alkyl Mercaptans.** W. V. Wirth, Woodstown, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,395,265. **Preparing 1,3-Dioxolane Polymers.** W. F. Gresham, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,395,292. **Reaction Product of Ethylene and an Acetal.** M. D. Peterson and A. G. Weber, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,395,293. **Gas-Expanded Cell-Tight Rubber.** H. Pfleumer, New Brunswick, N. J., assignor to Rubatex Products, Inc., New York, N. Y.

2,395,327. **Polymerizing Ethylene in an Aqueous Medium.** W. E. Hanford, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,395,344. **Heat Polymerization of Vinyl Halides.** F. K. Schoenfeld, Silver Lake, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,395,347. **Sulfur-Containing Esters of Hydrolyzed Interpolymers of Ethylene with a Vinyl Ester of an Organic Carboxylic Acid.** W. H. Sharkey, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,395,381. **Continuous Process for the Preparation of Interpolymers of Ethylene and Vinyl Acetate.** L. Squires, Westtown, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,395,400. **Condensation Product Obtained by Heat Polymerization in Presence of an Alkaline Catalyst from a Hydroxylated Polyethylene Amine and a High Molecular Weight Monocarboxy Acid.** M. De Groote, University, Mo., assignors to Petrolite Corp., Ltd., Wilmington, Del.

2,395,455. **Dihydronorpolycyclopentadienyl Isothiocyanate.** H. A. Bruson, assignor to Resinous Products & Chemical Co., both of Philadelphia, Pa.

2,395,474. **Vulcanizing a Copolymer of a Butadiene-1,3 Hydrocarbon and an Alpha Methylene Nitrile by Heating a Composition Including the Copolymer and an Oxide of Lead, but Which Is Free of Sulfur and Other Sulfur Containing Vulcanizing Agents, at 290° to 350° F. for 10 to 60 Minutes, Depending on the Temperature. Selected.** B. S. Garvey, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,395,493. **Vulcanizing Plastic Polymerized Chloroprene in the Presence of a Polyalkylene Polyamine in Which the Alkylene Groups Are Composed Exclusively of Carbon and Hydrogen.** H. P. Miller, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,395,504. **Liquid Polymerizable Mixture Including at Least One Monovinyl Aromatic Compound and Dehydrated Castor Oil.** L. C. Rubens and R. F. Boyer, assignors to Dow Chemical Co., all of Midland, Mich.

2,395,505. **Vulcanizing a Butadiene-1,3 Hydrocarbon Copolymerized with a Monoolefinic Compound in the Presence of a Member of the Class of Aliphatic Polyamines Composed Exclusively of Carbon, Hydrogen, and Amine Nitrogen Atoms and Hydroxy-Substituted Aliphatic Polyamines, Having Hydroxy Attached to the Carbon and Being Otherwise Exclusively Composed of Carbon, Hydrogen, and Amine Nitrogen Atoms, and in the Absence of Sulfur and Other Sulfur-Containing Vulcanizing Agents.** D. V. Sarbach, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,395,506. **Vulcanizing a Copolymer of a Butadiene-1,3 Hydrocarbon and an Unsaturated Compound Containing a Single Olefinic Double Bond, by Heating in the Presence of a Mixture of Litharge and an Oxide of a Metal Occurring in Group II of the Periodic Table and in the Absence of Sulfur and Other Sulfur-Containing Vulcanizing Agents.** D. E. Sauser, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,395,507. **Vulcanizing a Copolymer of a Butadiene-1,3 Hydrocarbon and a Monoolefinic Compound in the Presence of a Polyalkylene Polyamine.** D. E. Sauser, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,395,550. **Composition Including a Fatty Oil Modified Alkyd Resin and an Ester of a Polysilicic Acid and a Lower Monohydric Saturated Aliphatic Alcohol Having a Boiling Point Below 200° C.** R. K. Iler, Cleveland Heights, O., G. H. Latham, Wilmington, Del., and J. W. Robinson, Lakewood, O., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,395,581. **Composition Including a Copolymer of Vinyl Chloride and a Neutral Ester of a Saturated Alcohol and Fumaric Acid Modified with an Alkoxyalkyl Ester of an Aliphatic Dicarboxylic Acid.** H. J. Richter, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,395,616. **Flexible Plasticized Polyvinyl Alcohol Composition Containing as Thermostabilizing Agent a Substance from the Group of the Sulfates of Copper and Iron.** C. C. Dangelmajer, Nutley, assignor to Resistoflex Corp., Belleville, both in N. J.

2,395,642. **Fusible Polymers from a Preformed Dihydrazide of a Dicarboxylic Acid.** W. W. W. Prichard, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,395,649. **Chloroprene-Acrylic Nitrile Interpolymer.** F. C. Wagner, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,395,684. **Dispersing a Member of the Group of the Alkali Metal and Alkaline Earth Metal Sulfides and Polysulfides in a Polymerized Vinyl Ether to Improve Its Resistance to Depolymerization by Heat.** C. E. Schildknecht, Easton, Pa., assignor to General Aniline & Film Corp., New York, N. Y.

2,395,739. **Resin Produced by Simultaneously Reacting an Aromatic Hydrocarbon with an Aldehyde and a Compound from the Group of Polycarboxylic Acids and Anhydrides of Polycarboxylic Acids in the Presence of a Condensing Agent.** A. B. Hersberger, Lansdowne, Pa., assignor to Atlantic Refining Co., Philadelphia, Pa.

2,395,778. **Vulcanizing a Mixture Including an Elastomer, Carbon Black, Paraquinone Dioxime, Red Lead, and Salicylic Acid.** S. Breck, Rutherford, and E. S. Ebers, Nutley, both in N. J., assignors to United States Rubber Co., New York, N. Y.

2,395,812. **Polymerizing in Aqueous Emulsion an Alkyl Ester of 1-Carboxybutadiene-1,3 in Which the Alkyl Group Contains from One to Four Carbon Atoms.** H. Gudgeon and R. Hill, both of Blackley, Manchester, England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,395,826. **Dichlorofluorosilanes.** J. W. Hill, R. V. Lindsey, Jr., and R. H. Wiley, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,395,829. **Process Including the Pyrolysis of Polystyrene Resin under Conditions Such That Substantially Complete Thermal Decomposition of the Polystyrene Is Effected in not More Than 20 Minutes.** W. A. King, Meriden, Conn., assignor, by mesne assignments, to Allied Chemical & Dye Corp., a corporation of N. Y.

2,395,875. **Dehydrogenating Hydrocarbons of the Class of Monoolefins Having at Least Four Carbon Atoms in the Molecule and Alkylated Aromatics Containing at Least Two Carbon Atoms in the Alkyl Group in the Presence of Steam and Exposed to the Influence of a Catalyst Consisting of Magnesia, Iron Oxide, and Potassium Oxide.** K. K. Kearby, Elizabeth, N. J., assignor, by mesne assignments, to Jasco, Inc., a corporation of La.

2,395,876. **Dehydrogenating Olefins to Diolefins.** K. K. Kearby, Elizabeth, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,395,894. **Tastefree, Flexible Coating Composition for Metal Containers Which Includes a Phenol Aldehyde Resin Which Is Heat Convertible, Plasticized, and Modified by a Polyvinyl Acetal Resin of an Aliphatic Aldehyde.** W. F. May, Maywood, Ill., assignor to American Can Co., New York, N. Y.

2,395,895. **For the Surfaces of Sheet Metal Containers, Chemical and Corrosion Resistant Coating Composition Produced by Milling together an Unsaponifiable and Non-Acidic Cycloparaffin Resin Derived from the Hydrogenation of Indene and Coumarine Resins, and a Compatible, Rubber-Like, High Molecular Weight Polymer of Isobutene.** W. F. May, Maywood, Ill., assignor to American Can Co., New York, N. Y.

2,395,901. **Improved Method of Preparing High Molecular Weight Polymers by Polymerizing an Isoolefin in a Diluent at a Temperature below —40° C., in the Presence of a Friedel-Crafts-Type Catalyst.** E. V. Murphree, Summit, and W. W. Waterman and A. D. Green, both of Cranford, N. J., assignors, by mesne assignments, to Jasco, Inc., a corporation of La.

2,395,922. **Fireproofing Composition Including Coumarine-Indene Resin and a Water-Insoluble Solid Antimony Compound from the Group of Antimony Sulfide.** W. D. Timmons, Coshocton, Conn.

2,396,098. **Thermosetting Composition Capable of Being Compounded and Processed Like Natural Rubber Compounds, Including a Plasticized Polyvinyl Butyral, a Heat Hardening Resin Capable of Reacting with a Polyvinyl Butyral, Zinc Oxide, and an Accelerator.** J. L. Haas, assignor to Hodgman Rubber Co., both of Framingham, Mass.

2,396,125. **Simulated Patent Leather Formed from a Conjoint Polymer of Vinyl Chloride with Vinyl Acetate Resin, Heat Stabilizer, Lubricant, Plasticizer, Pigment.** J. R. Price, Jackson Heights, N. Y., assignor to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

2,396,129. **Reaction Product of Blown Corn Oil and Material from the Group of Phthalic Acid, Maleic Acid, and Their Anhydrides.** E. A. Rodman, Newburgh, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,396,193. **Preparing Melamine by Heating Cyanourea under Pressure at a Temperature of at least 200° C.** C. J. Paden, Glenbrook, and J. S. Mackay, Greenwich, both in Conn., assignors to American Cyanamid Co., New York, N. Y.

2,396,209. **An Acetal of a Hydrolyzed Interpolymer of Ethylene with a Vinyl Ester of an Organic Carboxylic Acid.** W. H. Sharkey, assignor to E. I. d Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,396,210. **Preparing a Xanthate of a Water-Insoluble Substantially Completely Hydrolyzed Interpolymer of a Vinyl Ester of an Organic Carboxylic Acid with Another Polymerizable Compound Containing a Single Ethylenic Double Bond.** W. H. Sharkey, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,396,293. **Composition Including a Copolymer of a Vinyl Aromatic Compound and a Conjugated Diolefin, a Polymerized Isoolefin of Molecular Weight between 60,000 and 200,000, and a Wax.** W. C. Smith, Elizabeth, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,396,342. **Waterproofing Composition Including Chlorinated Rubber, a Polyterpene Resin, a Water-Insoluble and Water-Repellent Metal Soap, a Fatty Glyceride Plasticizing Agent, and a Volatile Solvent.** A. B. Quick, East Norwich, N. Y.

2,396,416. **Butadiene from Pentene-2.** F. E. Frey, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

2,396,434. **An Ester from the Group of Beta-Phenoxyethyl Acrylate and Beta-Benzyl-Oxyethyl Acrylate.** C. E. Rehberg, Glenside, and C. H. Fisher, Abington, both in Pa., assignors to the United States of America, as represented by the Secretary of Agriculture.

2,396,555. **Polyvinyl Butyral Resin Containing 8-Hydroxy-Quinoline as a Stabilizer.** F. W. Cox, Cuyahoga Falls, assignor to Wingfoot Corp., Akron, both in O.

2,396,556. **Polyvinyl Butyral Resin Stabilized by the Tartrate of Hexamethylene Tetramine.** F. W. Cox, Cuyahoga Falls, assignor to Wingfoot Corp., Akron, both in O.

2,396,557. **Composition Containing a Polyvinyl Acetal Formed from Polyvinyl Alcohol and an Aliphatic Aldehyde, with N,N'-Dicyclohexyl Ethylene Diamine as Stabilizer.** F. W. Cox, Cuyahoga Falls, assignor to Wingfoot Corp., Akron, both in O.

2,396,586. **Copolymer of an Aliphatic Conjugated Diene Hydrocarbon and an Alpha (Omega Carboalkoxy Alkyl) Acrylonitrile.** J. R. Long, Stow, assignor to Wingfoot Corp., Akron, both in O.

2,396,600. **Recovering Chlorinated Rubber from Solution.** H. A. Pacevitz, now by judicial change of name, H. A. Pace, assignor to Wingfoot Corp., both of Akron, O.

2,396,607. **Calking Composition Which Is a Dispersion of Polyvinyl Acetal in Water, with a Mixture of Casein and Sodium Oleate as Dispersing Agent.** T. H. Rogers, assignor to Wingfoot Corp., both of Akron, O.

2,396,609. **Monomeric Methacrylic Acid Chloride.** W. Schmidt, Frankfurt a.M., Germany; vested in the Alien Property Custodian.

2,396,621. **Paste Consisting of a Mixture of**

A Complete Set of these Data Sheets will give your Maintenance Man Valuable hints. Previous Sheets will be sent upon request.

MAINTENANCE DATA SHEET NO. 4

CLAMPS FOR SCOTT TESTERS

If discrepancies still remain after correcting the Tester head, the difficulty may lie in the clamps.

On flat grip clamps for testing fabric, sheet metal or similar material, the gripping surfaces MUST be absolutely flat and parallel. Place a sheet of white paper and of very soft pencil carbon paper between the clamps, and close them tightly. If carbon is not deposited uniformly over the white paper it will indicate that the surfaces have become worn by testing hard material, or distorted by excessive pressure on the closing screw. Such clamps should be returned to the factory for resurfacing and realignment.

To determine parallelism of the long edge of the gripping surface: move the lower clamp down about 1"; measure the distance between the edges of the gripping surface at both ends. If not parallel, adjust the clamp which is out of line, by straightening the connection joining this clamp to the testing machine.

Cord, twine, wire or similar materials require drum-type clamps, of which the drum surface must be absolutely smooth, while the gripping surface of the clamps must apply uniform pressure throughout.

On wedge-type wire clamps, after considerable service the gripping surfaces become worn. Replacement inserts can be ordered, which are easily installed.

On drum-type wire clamps, (as the Jute Association wire clamp) the drum, eccentric roll and anvil should be replaced as soon as any amount of wear shows.

On all clamps, any surface subject to friction should be lubricated periodically, especially the hinge, screw thread and contact between screw and clamp body of fabric clamps, and the sliding wedge of wedge-type wire clamps.

The many Scott Testers supply the needs of testing textiles, rubber, wire, paper, etc., up to 1 ton tensile.

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2,396,677. **Polymerizing Ethylene in an Aqueous Medium in the Presence of an Organic Peroxide Catalyst and in the Absence of a Dispersing Agent.** M. M. Brubaker, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,396,698. **Combining Fatty Oil with Alkyd Resin-Forming Components.** E. C. Haines, Moorestown, assignor to G. W. Wetherill Varnish Co., Inc., Camden, both in N. J.

2,396,713. **The Copolymerization Products of a Composition Including Tetrafluoroethylene, a Perchlorofluoroethylene Containing at Least Two Fluorine Atoms, and a Hydrogen-Containing Halogenated Ethylene.** E. L. Martin, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,396,715. **Plasticized Synthetic Linear Polyamide.** F. C. McGrew, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,396,753. **Preparing a Hydrocarbon Product Containing a Major Proportion of Triisobutylene.** R. Rosen, Elizabeth, and O. C. Slotterbeck, Rahway, both in N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,396,785. **Polymerizing a Hydrolyzable Composition from Ethylene and an Organic Compound.** W. E. Hanford, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,396,786. **Mixture of Linear Polymeric Materials Having Nitrogen Groups Substituted for Hydrogen on Aromatic Carbon of Linear Polymeric Materials.** W. E. Hanford, Easton, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,396,788. **A Bis(Polyhalovinyl) Sulfide.** W. A. Hoffman, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,396,791. **Preparation of Normally Semi-Solid to Solid Polymers of Ethylene.** N. W. Krase, Swarthmore, Pa., and A. E. Lawrence, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,396,854. **Butadiene.** J. P. Jones, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

2,396,893. **Thiazoles.** J. K. Simons, Toledo, O., assignor, by mesne assignments, to Libbey-Owens-Ford Glass Co., a corporation of O.

2,396,894. **Synthetic Resins from Thiazoles.** J. K. Simons, Toledo, O., assignor, by mesne assignments, to Libbey-Owens-Ford Glass Co., a corporation of O.

2,396,907. **Coagulating a Butadiene - Styrene Latex by Freezing the Latex in a Freezing Zone, and Adding a Portion of the Synthetic Rubber Latex in Unfrozen Condition.** I. L. Wolk and J. D. Upham, both of Bartlesville, Okla., assignors to Phillips Petroleum Co., a corporation of Del.

2,396,920. **Polymerization of Ethylene in the Presence of Molecular Oxygen and in the Presence of a Per-Oxy Compound Catalyst, the Process Being Conducted in a Deoxygenated Aqueous Medium.** A. T. Larson, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,396,957. **Process in Which Monomeric Dithioglycidol Is Brought into Contact with a Polymeric Material until at Least a Portion of the Dithioglycidol Sulfur Has Become Bound to the Polymeric Material and Unbound Dithioglycidol Is Removed.** W. A. Lazier and F. K. Signaigo, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,396,963. **Polymeric Ketone Having a Molecular Weight of at Least 1,000, Having Multiple Recurring Structural Units Containing a Ketone Carbonyl Group, and Having Recurring Units Containing at Least One Beta-Cyanoethyl Group on a Carbon Contiguous to the Ketone Carbonyl.** C. W. Mortenson, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,396,968. **Vulcanizing a Synthetic Rubber Made by the Polymerization of a Butadiene-1,3 Hydrocarbon with an Ethylene Compound, by Heating in the Presence of Sulfur and the Reaction Product of Formaldehyde with a Mercapto-arylthiazole, and in the presence of an Aromatic Carboxylic Acid.** W. E. Phillips, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,396,997. **Polymerizing an Organic Compound from the Class of Styrene and Esters of Acrylic Acid in the Presence of Sulfur-Containing Modifiers of Polymerization.** C. F. Fryling, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,397,050. **Synthetic Rubber Composition Including a Copolymer of Butadiene-1,3 and Styrene and a Copolymer of Butadiene-1,3 and Acrylonitrile.** D. V. Sarbach, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,397,065. **Recovering 2:3 Butylene Glycol from a Liquid Concentrate of a Carbohydrate Fermentation.** R. A. Walmesley, Dalry, and W. R. Davis, Stevenson, both in Scotland, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

Dominion of Canada

433,758. **Thio-alkyl Compound.** Alox Corp., New York, assignee of A. W. Burwell, Niagara Falls, both in N. Y., and J. A. Cameltord, Cleveland, O., both in the U.S.A.

433,775. **A Resinous Composition Including a Glycol Mono-Maleate Decarboxylated in the Presence of a Cyclic Amine from the Group of Pyridine, Quinoline, Nicotine, and Piperidine and Their Homologs.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of M. C. Agens, Schenectady, N. Y., U.S.A.

433,780. **Preparing a Fast Drying Film-Forming Composition by Reacting Ingredients Including a Polyhydric Alcohol of More than Two Hydroxyl Groups Partially Acylated with Fatty Oil Acid, and an Alpha-Beta Unsaturated Dicarboxylic Acid.** Canadian Industries, Ltd., Montreal, P. Q., assignee of L. P. Hubbuach, Springfield, and P. Robinson, Llarerch, both in Pa., U.S.A.

433,781. **Preparing Butadiene, Which Includes the Steps of Pyrolyzing Cyclohexane and Recovering the Butadiene from the Reaction Vapors by Absorption in a Liquid Hydro-Carbon.** Canadian Industries, Ltd., Montreal, P. Q., assignee of A. E. Lawrence, Wilmington, Del., U.S.A.

433,784. **Preventing the Deterioration of Rubber at Elevated Temperatures in the Presence of Oxygen by Incorporating a Mixture Including a Member of the Group of N,N'-Diphenyl-Benzidine and C-Substituted N,N'-Diphenyl-Benzidine, and a Different Secondary Aromatic Amine Devoid of Strongly Negative Groups of the Character of —COOH, —SO_3H and —NO_2 Groups.** Canadian Industries, Ltd., Montreal, P. Q., assignee of A. M. Neal and J. R. Vincent, both of Wilmington, Del., U.S.A.

433,786. **Inhibiting the Deterioration of Rubber by Incorporating a Small Proportion of a Secondary Aromatic Amine Antioxidant and a Small Proportion of a Member of the Group of Terpene Mercaptans and Metal Terpene Mercaptides, in Which the Metal Is of the Group II-B of the Periodic Table.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. R. Vincent, Wilmington, Del., U.S.A.

433,844. **Producing Isobutane from Saturated Petroleum Naphthas.** Standard Oil Co., Chicago, Ill., assignee of R. F. Ruthruff, Nutley, N. J., both in the U.S.A.

433,860. **Production of Artificial Filaments from a Solution of a Polymerized Mixture of a Vinyl Halide and a Vinyl Ester of an Aliphatic Acid in a Mixture of Acetone and Another Organic Liquid.** C. G. Bonard, London, administrator of the estate of H. Dreyfus, deceased, in his lifetime of London, assignee of R. P. Roberts and E. B. Johnson, both Spondon, and M. A. Young, Mangotsfield, Bristol, formerly of Spondon, all in England.

433,890. **Vulcanizing Rubber and Rubber-Like Materials in the Presence of Sulfur and an Accelerator Including the Stable Chemical Complex Softening at 65-80° C. Obtained by Fusing a Diarylguanidine-Zinc Chloride Adduct with Paraformaldehyde and a Substance from the Group of Mercaptobenzothiazole, Benzothiazole Disulfide, and Mercaptothiazoline.** American Cyanamid Co., New York, N. Y., assignee of A. R. Davis, Riverside, Conn., both in the U.S.A.

433,929. **In Preparing a Phenol-Formaldehyde Resin Composition Which Is Convertible into a Hard, Infusible Insoluble Product by the Inclusion of an Acid-Hardening Agent, the Method of Determining the Extent or Uniformity of Distribution of Such Acid Hardening Agent by Mixing an Organic Dyestuff Which Changes Color in the Presence of the Acid Hardening Agent.** Haveg Corp., assignee of H. H. Lebach, both of Newark, Del., U.S.A.

433,930-931. **Improving Textile or Other Material by Impregnation with an Isocyanate of the Group of Aliphatic Isocyanates Mixed with Aliphatic-Aromatic Isocyanates, and Naphthenic Isocyanates.** Heberlein Patent Corp., New York, N. Y., U.S.A., assignee of W. Kaase and E. Waltmann, both of Krefeld, Germany.

433,993. **Hard Self-Luminous Paint Produced by Mixing Luminous Paint Powder with Granulated Polymerized Methacrylate.** C. A. LeBeau, West Kildonan, Man.

434,023. **Vulcanizing Rubber in the Presence of Sulfur and the Condensation Product Obtained by Fusing a Mercaptoarylthiazole, Cyanamide, and a Formaldehyde Polymer.** American Cyanamid Co., New York, N. Y., assignee of A. R. Davis, Riverside, Conn., both in the U.S.A.

434,024. **Vulcanizing Rubber in the Presence of Sulfur and the Condensation Product of Mercaptobenzothiazole, Cyanamide, and Formaldehyde.** American Cyanamid, New York, N. Y., assignee of R. T. Dean, Stamford, Conn., both in the U.S.A.

434,047. **Resinous Condensation Product of Ingredients Including an Aldehyde and an Aliphatic Ester of Bis-(Diamino s-Triazinyl Thio) Acetic Acid.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. F. D'Alelio and J. W. Underwood, both of Pittsfield, Mass., U.S.A.

434,048. **Cation-Exchange Material Consisting of an Infusible Resinous Reaction Product of a Phenol and a Nitrourea.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. F. D'Alelio, Pittsfield, Mass., U.S.A.

434,107. **An Adhesive Including One part to Four Parts of Rubber to Six Parts of Resinous Material.** Minnesota Mining & Mfg. Co., assignee of R. G. Drew, both of St. Paul, Minn., U.S.A.

United Kingdom

575,283. **Artificial Aqueous Dispersions of Rubber, Rubber Substitutes, and Rubber-Like Substances.** N. Talalay.

575,380. **Ethylene Glycol.** E. I. du Pont de Nemours & Co., Inc., and A. T. Larson.

575,381. **Vinyl Chloride.** Distillers Co., Ltd., and H. M. Stanley.

575,386. **Complex Esters and Polymers thereof.** F. J. Cleveland. (Pittsburgh Plate Glass Co.).

575,419. **Polyamides.** Wingfoot Corp.

575,477. **Resinous Coating Compositions.** B. J. Balfe and Imperial Chemical Industries, Ltd.

575,541. **Plasticizing and Softening Rubber and Synthetic Rubber-Like Materials.** American Cyanamid Co.

575,545. **Reclaiming Scrap Containing Vulcanized Copolymers of Butadiene-1,3 and Monovinyl Compounds.** United States Rubber Co.

575,546. **Reclaiming Scrap Vulcanized Rubber.** United States Rubber Co.

575,547. **Reclaiming Waste Polychloroprenes.** United States Rubber Co.

575,549. **Vulcanizing Neoprene.** Industrial Chemical Industries, Ltd.

575,603. **Isobutane.** Standard Oil Development Co.

575,609. **Manufacture and Use of Derivatives of Guanidine.** Dunlop Rubber Co., Ltd., and J. A. Teicher and D. F. Twiss.

575,611. **Alkali-Resistant Alginic Fibers and Films.** P. L. D. Peill, N. H. Chamberlain, and Cefoil, Ltd.

575,616. **Polymeric Materials from Unsymmetrical Dichloroethylene.** R. G. R. Bacon, J. R. Lewis, L. B. Morgan, and Imperial Chemical Industries, Ltd.

575,626. **Polyvinyl Ethers.** E. I. du Pont de Nemours & Co., Inc., and R. C. Houtz.

575,635. **Hydrocarbon Interpolymers.** Standard Oil Development Co.

575,649. **Vinyl Halide Polymer and Copolymer Stabilization.** Wingfoot Corp.

575,652. **Formation and Polymerization of Esters of Dicarbamic Acids.** Wingfoot Corp.

575,667-668. **Organosilicon Halides.** British Thomson-Houston Co.

575,672. **Tetrachloroethylene and Chlorosilanes.** British Thomson-Houston Co., Ltd.

575,673-674. **Organosilicons.** British Thomson-Houston Co., Ltd.

575,689. **Treatment of Hydrolyzed Interpolymers of Ethylene.** E. I. du Pont de Nemours & Co., Inc.

575,736. **Preservation of Rubber Compositions.** United States Rubber Co.

575,756. **Halo-Fluoro Derivatives of Aliphatic Hydrocarbons.** E. I. du Pont de Nemours & Co., Inc.

575,767-768. **Adhesive Compositions for Bonding Surfaces.** B. B. Chemical Co., Ltd., L. E. Puddefoot, W. H. Swire, K. H. Elsen, and A. D. Woods.

575,873. **Expanded Plastics.** Expanded Rubber Co., Ltd., and A. Cooper.

575,901. **Polymer Dispersions Containing Plasticizers.** R. G. R. Bacon, L. Wood, and Imperial Chemical Industries, Ltd.

576,021. **Synthetic Materials.** Kodak, Ltd. (Eastman Kodak Co., W. O. Kenyon, and W. F. Fowler, Jr.).

576,022-023. **Synthetic Resins.** Kodak Ltd. (Eastman Kodak Co., W. O. Kenyon, and J. H. van Campen).

576,071. **Methyl Methacrylate Compositions.** E. I. du Pont de Nemours & Co., Inc., and F. L. Johnston.

576,083. **Complex Esters and Their Polymers.** Pittsburgh Plate Glass Co.

576,099. **Halogenated Hydrocarbons.** D. G. Jones, M. Phillipson, and Imperial Chemical Industries, Ltd.

576,101. **Improving the Properties of Foils, Films, Fibers, Etc., Made from Alginic Acid or Water-Insoluble Alginates.** Tootal Broadhurst Lee Co., Ltd., S. E. Lawton, and F. C. Wood.

576,106. **Polyvinyl Alcohol Compositions.** J. I. Jones.

576,110. **Polyvinyl Resin Compound for Covering Electric Wires and Cables.** W. T. Henley's Telegraph Works Co., Ltd., and W. F. O. Pollett.

576,119. **Organic Halogen Compounds.** J. R. Myles, F. S. B. Jones, and Imperial Chemical Industries, Ltd.

576,134. **Waterproof Coating.** Shawinigan Chemicals, Ltd.

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NEW ORLEANS — E. W Ortenbach
TORONTO & MONTREAL — Richardson Agencies, Ltd.

576,153. **Condensation Products and Polymerization Products thereof.** Pittsburgh Plate Glass Co.
576,156. **Alkylation of Olefins with Isoparaffins.** Standard Oil Development Co.
576,157. **Synthetic Latex.** Wingfoot Corp.
576,160. **Polymeric Materials.** R. G. R. Bacon, S. G. Jarrett, L. B. Morgan, and Imperial Chemical Industries, Ltd.
576,189. **Fluorinated Derivatives of Methane.** J. H. Brown, W. B. Whalley, and Imperial Chemical Industries, Ltd.
576,190. **Fluorinated Derivatives of Aliphatic Hydrocarbons.** J. H. Brown, W. B. Whalley, and Imperial Chemical Industries, Ltd.
576,221. **Rubber-Like Materials.** Standard Oil Development Co.
576,228. **Artificial Rubber-Like Materials.** R. B. Drew, K. R. Dutton, British Glues & Chemicals, Ltd.
576,271. **Synthetic Rubber.** Firestone Tire & Rubber Co., Ltd., and M. M. Heywood.
576,293. **Vinyl Halide Polymer and Copolymer Stabilization.** Wingfoot Corp.
576,304. **Insulating and Dielectric Compositions.** British Thomson-Houston Co., Ltd.
576,316. **Castor Oil Products.** Shell Development Co.
576,317. **Resinous Products from Castor Oil.** Shell Development Co.
576,330. **Resinous Compositions and Abrasives.** Norton Grinding Wheel Co., Ltd.
576,362. **Coatings and Shaped Articles from Synthetic Linear Polyamides.** E. I. du Pont de Nemours & Co., Inc.
576,363. **Derivatives of Synthetic Linear Polyamides.** E. I. du Pont de Nemours & Co., Inc.
576,365. **Anti-Static Coatings for Films.** E. I. du Pont de Nemours & Co., Inc.

MACHINERY

United States

2,394,658. **Vulcanizing Press.** H. Blount, Baltimore, Md., assignor to Western Electric Co., Inc., New York, N. Y.
2,394,941. **Apparatus for Simultaneously Molding a Plurality of Blanks of Resinous Material.** C. V. Smith, Worcester, Mass., assignor to Univis Lens Co., Dayton, O.
2,395,020. **Tire Building Apparatus.** F. S. Sternad, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,395,079. **Polymerization Reactor.** W. J. Sparks, Elizabeth, and D. C. Field, Linden, both in N. J., assignors, by mesne assignments, to Jasco Inc., a corporation of La.
2,395,144. **Mandrel for Forming Enlarged Vibration Dampening Elements in Hose Sections.** W. L. Stivason, Hamilton Square, assignor to Whitehead Bros. Rubber Co., Trenton, both in N. J.
2,395,217. **Apparatus to Make Pile Fabrics Having a Base and Individual Upstanding Fibers Adhesively Secured thereto.** R. E. Ford, Philadelphia, Pa., and J. W. Hunt, Trenton, N. J., assignors, by direct and mesne assignments, to Continental Carpet Corp., Philadelphia, Pa.
2,395,316. **Molding Apparatus.** A. J. Brunner, Congress Park, Ill., assignor to Western Electric Co., Inc., New York, N. Y.
2,395,920. **Apparatus for Making Sponge Rubber.** T. A. Te Grotenhuis, Olmstead Falls, O.
2,396,042. **Pressing Apparatus.** B. A. Evans, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,396,186. **Apparatus for Turning down the Projecting Ends of Tire Ply Fabrics against the End Surface of a Forming Drum.** C. S. McChesney, Kenmore, assignor to Dunlop Tire & Rubber Corp., Buffalo, both in N. Y.
2,396,781. **Manually Controlled Mechanism for Tire Molds.** E. A. Glynn, Lodi, Calif., assignor to Super Mold Corp. of California, Lodi, California.
2,396,968. **Torch for Welding Thermoplastic Material.** W. M. Phillips, Jr., assignor to Udylite Corp., both of Detroit, Mich.

Dominion of Canada

433,696. **Injection Molding Apparatus.** Hydraulic Development Corp., Wilmington, Del., assignee of W. R. Tucker, Dayton, O., both in the U.S.A.
433,948. **Polymerization Apparatus.** Standard Oil Development Co., Linden, assignee of M. D. Mann, Jr., Roselle, both in N. J., U.S.A.

United Kingdom

575,323. **Injection Molding Machines for Thermosetting Materials.** R. H. Windsor and E. Gaspar.
576,253. **Screw Pumps for the Extrusion of Synthetic Polymers.** Imperial Chemical Industries, Ltd.

UNCLASSIFIED

United States

2,394,632. **Coupling Structure for Flexible Tubes.** A. L. Parker, assignor to Parker Appliance Co., both of Cleveland, O.
2,395,013. **Tire Chain Applying Device.** T. C. Reese, Ardmore, Pa.
2,395,064. **Rim Structure for Wheels.** E. Porter, assignor of 2/20 to A. W. Larson, both of Akron, O.
2,395,273. **Hose Clamp.** F. L. Hill and K. A. Hill, Rockford, Ill., K. A. Hill assignor to F. L. Hill.
2,395,668. **Liner for Adherent Rubber Surfaces, Etc.** W. Kellgren and W. D. Hurd, assignors to Minnesota Mining & Mfg. Co., all of St. Paul, Minn.
2,396,532. **Tire Chain.** G. E. Roff, Goodland, Kan.
2,396,594. **Insulation Remover.** T. W. Moore, assignor to Leland Electric Co., both of Dayton, O.
2,396,871. **High Voltage Cable Connection.** A. Meyerhaus, Rieden, assignor to A. G. Brown, Boverie & Cie, Baden, both in Switzerland.

Dominion of Canada

433,629. **Wheel Structure.** G. A. Lyon, Allenhurst, N. J., U.S.A.

United Kingdom

575,279. **Wheel Rims for Use with Pneumatic Tires.** Wingfoot Corp.
575,495. **Tester for Coils of Insulated Wire.** G. F. Frogley.
575,558. **Apparatus for Removing Pneumatic Tires from Vehicle Wheels.** W. Littlewood.
576,040. **Apparatus for Effecting and Controlling the Inflation of Pneumatic Tires for Vehicle Wheels.** Westinghouse Brake & Signal Co., Ltd., and L. H. Peter.
576,064. **Fluid Pressure Indicators for Pneumatic Tires and Other Inflated Bodies.** W. Turner.

TRADE MARKS

United States

419,311. Representation of an airplane, with the words: **"Western Aero"** above the wings. Airplane shock absorbers. W. B. Matthews, doing business as W. B. Matthews Co., San Antonio, Tex.
419,320. **"RC."** Dress shields. Rubber Corp. of America, Brooklyn, N. Y.
419,321. **"RC."** Crib sheets. Rubber Corp. of America, Brooklyn, N. Y.
419,326. **Amistan.** Rubber and/or plastic composition in sheet form for shoe soles. North Bergen Rubber Mfg. Co., North Bergen, N. J.
419,327. **Hanistan.** Rubber and/or plastic composition in sheet form for shoe soles. North Bergen Rubber Mfg. Co., North Bergen, N. J.
419,351. Fanciful design with the words: **"No. 42 Film Finish For All Surfaces That Need Coating."** Liquid preparation to produce transparent finishing coating. B. J. Hardy, New York, N. Y.
419,407. **Super 3.** Storage batteries. General Tire & Rubber Co., Akron, O.
419,433. **Road Lug.** Tires. Goodyear Tire & Rubber Co., Akron, O.
419,474. Representation of a primitive lamp surrounded by flames. Carbon black, natural resins, synthetic resins, etc. C. P. Hall Co., Akron, O.
419,577. **Velex.** Dispersions, emulsions, and latices composed of plastics and/or synthetic resins. Firestone Tire & Rubber Co., doing business under the name of Firestone Industrial Products Co., Akron, O.
419,615. **Resistoflex.** Friction power transmission rings, flexible tubes, hose and hose lengths, sheets, films, gaskets, washers, and packing. Resistoflex Corp., Belleville, N. J.
419,638. **Hammer.** Hose. Ingersoll-Rand Co., Phillipsburg, N. J.
419,652. **Ruffian.** Hose. Ingersoll-Rand Co., Phillipsburg, N. J.
419,658. **"TR."** V-belts. Gates Rubber Co., Denver, Colo.
419,726. **Elastibles The Shoe with the 2 Way Stretch.** Footwear. Spiegel, Inc., Chicago, Ill.
419,727. Representation of a primitive lamp with flames surrounding it. Rubber compounding ingredients, accelerators, antioxidants, plasticizers for rubber and other plastics, etc. C. P. Hall Co., Akron, O.
419,730. Representation of elastic spelling out the word: **"Conanette."** Wide elastic fabrics. United Elastic Corp., Easthampton, Mass.
419,748. **Magi-flex.** Shoes and arch cushions. Spencer Shoe Corp., Boston, Mass.
419,794. **Ruggards.** Footwear. Allen-Squire Co., Spencer, Mass.
419,797. **Arista.** Foundation garments, corsets, girdles, and brassieres. Arista Foundations, New York, N. Y.
419,800. **Jiminy Kix.** Footwear. Daytimer Shoe Co., North Adams, Mass.
419,801. **Microcarb.** Carbon black. Oil & Gas Research, Inc., Wilmington, Del.
419,802. **Pyrocarb.** Carbon black. Oil & Gas Research, Inc., Wilmington, Del.
419,833. Representation of three oak trees with the name: **"Warren's"** above them. Brassieres, girdles, garter belts, hose supporters, raincoats, capes, baby bibs, aprons, shower caps, and make-up capes. Warren Featherbone Co., Three Oaks, Mich.
419,837. Representation of a label containing a caricature of a professor and the words: **"Prof. Callan's Brazillian Gum."** Adhesive cements. O'Sullivan Rubber Co., Inc., Winchester, Va.
419,890. **Hickok.** Raincoats, bathing suits, parkas, and ponchos. Hickok Mfg. Co., Rochester, N. Y.
419,909. **In-Dor-Ees.** Slippers. W. Cohan, Chicago, Ill.
419,967. **Orthophen.** Antioxidants. Sharples Chemicals, Inc., Philadelphia, Pa.
419,992. **Pentacizer.** Solvents, softening, plastizing, tackifying, and lubricating agents for plastic and rubbery compositions. Heyden Chemical Corp., New York, N. Y.
419,993. **Pentamull.** Materials having surface active properties and useful as wetting, emulsifying and dispersing agents, flotation reagents, lubricating oil adjuvants, etc. Heyden Chemical Corp., New York, N. Y.
420,010. **Kytoon.** Small balloons adapted to suspend meteorological instruments, emergency radio antennas, and other signaling apparatus. Dewey & Almy Chemical Co., Cambridge, Mass.
420,013. **Honite.** Abrasive in particulate or piece form. Minnesota Mining & Mfg. Co., St. Paul, Minn.

Foreign Trade Opportunities

The United States Department of Commerce, in cooperation with the American Foreign Service, has resumed an old, established aid to foreign trades—the dissemination of special opportunities to buy or sell abroad. This service is one of a number to overseas traders discontinued with the declaration of war in December, 1941.

The firms and individuals listed below have recently expressed their interest in buying in the United States or in United States representations. Additional information concerning each import or export opportunity, including a World Trade Directory Report, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the Department of Commerce, or through its field offices, for $1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arrangements.

Export Opportunities

Establissements Benoit Lauwaert, 109 Ave. Defre, Brussels, Belgium: artificial leather.

Jorge y Juan Lasen, Puente Alto, Chile: machinery for the manufacture of waterproof cloth.

Albert E. James and Leslie F. Butler, 259 Collins St., representing Ayers & James Pty. Ltd., 122-28 Flinders St., both of Melbourne, Victoria, Australia: druggists' sundries.

Ragnar Tanberg, representing Drammens Glassverk, Drammen, Norway: plastics.

Julius Jockton, 5 Kungsgatan, Stockholm, Sweden, representing AB. Amerikansks Motor Importers: automobile accessories.

Maison F. St. Eloi & Co. S. A., 37 Blvd. Audent, Charleroi, Belgium: resins and plastics.

Wright Shoe Co., P. O. Box 2, Charlottetown, P. E. I., Canada: rubber footwear.

Wathier Hamilton, representing AB. Superba, Steninge, Marsta, Sweden: hospital supplies, workmen's protective clothing.

J. Bruder, representing Heinrich Gautschi & Co., Sonntagsteig 3, Zurich, Switzerland: plastic molding, presses, and plastic materials.

Dessoy Freres, 18 Bolwerkstraat, Antwerp, Belgium: rubber hose.

Luiz Humberto Davila Hidalgo, representing Oscar Santos & Cia., Ltda., Rua 15 de Novembro 132, Belem, Para, Brazil: *Coguirana* balata.

Knud Wold, representing Willy Rasmussen & Co., Copenhagen, Denmark: plastics, adhesives.

Michel Habourdin, 11 Ave. de Versailles, Paris 16, France: druggists' sundries, electrical appliances.

SYNTHETIC RUBBER

PLUS

GY-4

PLASTICIZER

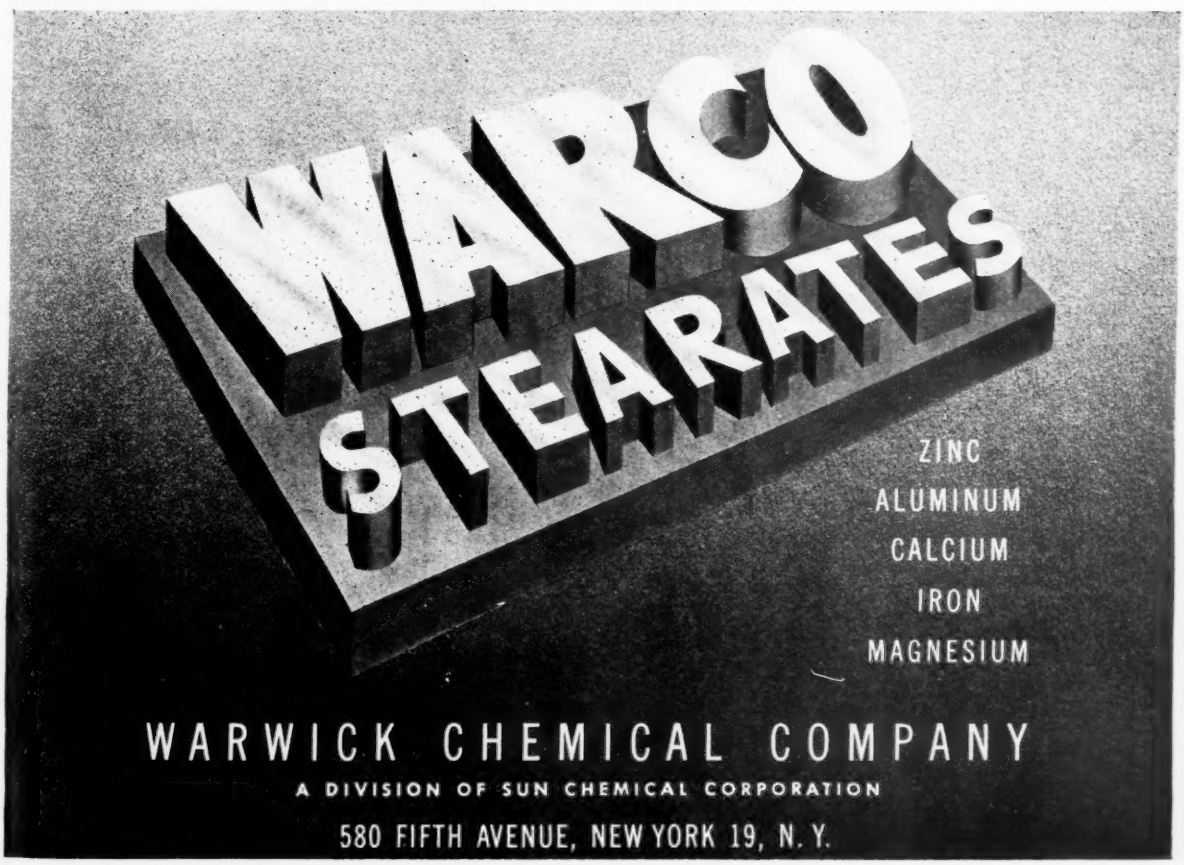
EQUALS

NATURAL RUBBER PROCESSING

A stabilized product that reduces the heat created by friction and does not volatilize during the mix or rob the stock of the necessary tack.

GALEY MANUFACTURING COMPANY

17700 LAKE SHORE BLVD. CLEVELAND 19, OHIO



WARWICK CHEMICAL COMPANY

A DIVISION OF SUN CHEMICAL CORPORATION

580 FIFTH AVENUE, NEW YORK 19, N. Y.

Mario Blanco-Uribe, representing Jose Ramirez MacGregor, Calle Comercio No. 64, Maracaibo, Venezuela: tires.

Etablissements Comant & Cuvelier S.A., Blvd. des Combatants, Tournai, Belgium: crude balata gum.

V. Habrant, Fils, 16 Rue Neuvice, Liege, Belgium: leather and rubber shoes.

Karel Barth, 8 Prikopy, Prague II, Czechoslovakia: office supplies of rubber, fountain pens.

Foreign Trade Co., Ltd., 21 Revolucni tr., Prague I, Czechoslovakia: synthetic resins, pigments, chemical products.

Ing. Butta a Goetzel, 11 Karoliny Svetle Prague I, Czechoslovakia: technical articles made of rubber, asbestos, belts, ball and roller bearings, automobile articles.

Dott. Sergio Dolfi & Co., 29 Via Guido Monaco, Florence, Italy: celluose tape and similar adhesives, druggists' sundries, adhesive plasters.

Norman H. C. Kincaid, Liberty Agencies (Pty.) Ltd., P. O. Box 6019, Johannesburg, South Africa: sporting goods, toys, dolls.

Ramon Montiel, of Ramon Montiel & Cia., Caracas, Venezuela: sporting goods, toys, general merchandise.

La Carrosserie Enfantine S.A., Deynze, Belgium: rubberized cloth, rubber tires for children's carriages.

L. R. Thomas, 3-3a Rue Capouillet, Brussels, Belgium: electric cables, small refrigerators.

Ronald Price, of Price & Sons, P. O. Box 689, Capetown, South Africa: plastics, sporting goods, toys.

Victor Poumay, 17 Rue Neuville, Bresseux-Liege, Belgium: rubber V-belts.

Aaron J. Matalon, of Matalon & Co., 94 Orange St., Kingston, Jamaica: automobile supplies and tire retreading.

Gerard Valcke-Waelkens, 18 Quai Louise Marie, Audenaerde, Belgium: radio sets, household refrigerators, wires and cables.

Adriana Bartolini & Cesare Doni, 45 Via Ponte Rosse, Florence, Italy: tires for automobiles, trucks, motorcycles, and bicycles.

Manifattura Italiana Impermeabili G. Breschi & Co., 24 r. Via della Scalla, Florence, Italy: rubberized cloth for raincoats.

Chantiers Navals Jos. Boel & Fils, S.A., Tamise, Belgium: hand-portable electric lamps made entirely of rubber.

S.A. des Carrières & des Fours a Chaux de la Meuse, 17 Place des Guillemins, Liege, Belgium: endless belts and material conveyors.

Emporio Duilio—G. Siebzehner & Co., 13 Via del Corso, Florence, Italy: women's foundation and similar garments, rubber products as boots, overshoes, sanitary goods.

Società per Imprese Autotrasporti (SAIRA), 68 Lungarno Amerigo Vespucci, Florence, Italy: automobile, motorcycle, truck, and trailer tires.

Claude Winter, representing Société des Anciens Etablissements, 14-18 Rue Guilhem, Paris, France: wire cables, rubber hose.

Mogens Brix-Kjelgaard, Avenue Lucien Saint, Anfa Sup., Casablanca, Morocco: tires, automobile accessories.

Cecil Wootton Clark, representing Harris Langton, Ltd., 428-32 Queen St., Auckland, New Zealand: materials suitable for raincoats.

Rudolf Demuth, Rua Vigario Jose Ignacio 153, Porto Alegre, Brazil: automotive accessories.

Max Eidelman—Almacen Alcyon, Carrera 8, No. 15-81, Bogota, Colombia: toys, sporting goods.

Donald J. Murphy, representing Mid-America Trading Co. Calles 1/3, Avenida 5, Apartado 1227, San Jose, Costa Rica: raincoats.

M. A. Prussoff, representing Brown, Geisler, Pty. Ltd., Johannesburg, South Africa: druggists' rubber sundries.

Peradin, Ltd., Freshford Mill, Freshford, Somerset, England: four- or five-roll vulcanizing calender for producing long-length vulcanized rubber flooring.

Naef Bros., 3 Scali D'Azeglio, Leghorn, Italy: machinery, resins and molding compounds used in the plastics industry, and tires for automobiles, bicycles and tractors.

Limon Beltran Wahnnatah, representing Cia. Perforaciones Mexicana, S. A., Vildosola 74 P., Hermosillo, Sonora, Mexico: used tires.

Herman Molvidson, representing J. Leibson, A. B., 4 Arsenalsgatan, Stockholm, Sweden: industrial chemicals and raw materials, golf balls, tennis shoes, raincoats.

Tricot Elastique Moderne, 23 Rue Adolphe Lavallee, Brussels, Belgium: rubber thread in skeins.

Casa Agricola V. Franchini Soc. Acc., 16 Via Pandolfini, Florence, Italy: tires and tubes for farm vehicles.

Società Importazioni American Nord—"Siman," 15 Via Montebello, Florence, Italy: glues and rubber cements.

Mrs. E. Rheinboldt, representing Honduras Farmacéutica Industrial, S. A., Apartado Postal No. 126, Tegucigalpa, D. C., Honduras: druggists' sundries.

Attilio Parentini, 2 Piazza S. Giovanni, Florence, Italy: pigments and dyes used in the manufacture of rubberized cloth, etc.

Robert Bron (Editions "Star,") 101 Rue de Linthout, Brussels, Belgium: fountain pens, pencils, erasers.

Novex Handelmaatschapij, N. V., 3, Krammerstraat, Amsterdam, Z., Netherlands: bicycle tires and accessories.

Financial

(*Continued from page* 416)

Union Asbestos & Rubber Co., Chicago, Ill. March quarter, 1946: net profit, $97,643; net sales, $1,372,843.

United Carbon Co., Charleston, W. Va. and subsidiaries. First quarter, 1946: net income, $678,301, equal to $1.70 a share, compared with $496,958, or $1.25 a share, in last year's quarter.

Westinghouse Air Brake Co., Wilmerding, Pa., and subsidiaries. First quarter, 1946: net income, $2,413,245, equal to 76¢ a share, against $1,069,513, or 34¢ a share, in the corresponding period last year.

S. S. White Dental Mfg. Co., Philadelphia, Pa., and subsidiaries. March quarter, 1946: net profit, $259,673, equal to 86¢ a share, compared with $174,358, or 58¢ a share, in 1945; net sales $4,588,062, against $4,204,555.

New Incorporations

Acme Mould Products Co., 111 W. Washington St., Chicago, Ill. Capital, 200 shares common par value, $100. Incorporators: L. Ratini, G. Mazzoni, F. Fairbank. Correspondent: H. L. Steed, 111 W. Washington St., Chicago, Ill. To deal in, distribute, and develop rubber products.

Alcan Rubber Co., Brookline, Mass. Capital, $200,000, divided into 2,000 shares of $100 each. Commence with 1,600. Incorporators: F. A. Remmes, Danielson; N. Josephs, Newton; and G. Shapiro, Canton, all in Mass.; and D. Schrage, Providence, R. I.

Ashland Rubber Products Corp., Columbus, O., Capital, 250 shares, no par value. Incorporators: C. A. Butts, B. L. Morr, and R. W. Lett.

Bond Rubber Corp., 42 Church St., New Haven, Conn. Capital, $20,000, 800 shares par value, $25. Officers: president, R. A. Pedoloff, Holyoke, Mass.; treasurer, S. Rabinowitz; secretary, H. P. Lander, both in New Haven.

Durable Rubber Products Co., 56 St. George Ave., Avenel, N. J. Capital, 10,000 shares of $10 each. Holders of stock: H. Goodrich, Avenel, and J. Cavadini, North Bergen, both in N. J. To manufacture all types of rubber goods.

Graceful Footwear Co., 45 Church St., Paterson, N. J. Capital, $100,000, stock consists of 1,000 shares at $100 each. Agent: H. D. Edelson. To engage in general manufacture, sales of footwear, rubber goods, arch supports, and other foot appliances.

Syracuse Rubber Products Co., Inc., 505 South Huntington St., Syracuse, N. Y. Capital, 400 shares of preferred stock of $100 par value, and 400 shares common no par value. Agent, P. L. Lantz, 1115 S. Seventh St., Goshen, N. Y. To manufacture rubber, plastics, and synthetic resinous products.

Thermo-Products, Inc., North Judson, Ind. Incorporators: John S. and Marjoria R. Cunningham and John L. Gillen. To manufacture and sell metal, wood, rubber, plastic, and other kinds of merchandise.

German Acetylene Chemistry Developments

New synthetic fibers and many products which have important potential uses in the manufacture of plastics and plasticizers and in the rubber industry were developed by German chemists during the war and will prove of great value to American industry, according to Carl C. Monrad, of Carnegie Institute of Technology, before the Chicago Section of the American Chemical Society on April 26. Dr. Monrad visited Germany last year as a member of a technical intelligence investigating team which studied synthetic rubber developments there.

Many of the reactions used in Germany were novel, and a rather large number of new organic intermediates was produced there on a commercial scale, it was said. A great many of these compounds are essentially made from ethylene produced by hydrogenating acetylene and hence are of little interest to American chemists since such products as glycols, styrene, etc., can be made more cheaply here from petroleum ethylene. Similarly we have relatively little interest in the manufacture of butadiene from acetaldehyde or from formaldehyde and acetylene, as we have much cheaper processes available from petroleum. Some of the intermediates produced in these processes, however, are of definite interest for the manufacture of other, and in some cases new, products.

The following are some of the more interesting German developments:

(1) Direct vinylation reactions. These involve the reaction of acetylene with alcohols, acids, sulfides, and amines to produce vinyl ethers, esters, sulfides, and amines. These products have many potential uses, particularly in making plastics, plasticizers, and rubber tackifiers.

(2) Direct carbon-carbon linkage, inserting acetylene into molecules such as aldehydes, ketones, etc. This yields highly unsaturated and reactive compounds which can be processed further to produce butadiene, acrylic acid, acrylonitrile, adipic acid, mono-, di-, and trihydroxy aliphatics, etc.

(3) Carbon monoxide addition to such materials as acetylene, tetrahydrofurane, etc., to give adipic and acrylic acids.

(4) Development of new synthetic fibers and methods for producing intermediate products.

(5) Manufacture of a number of rather new intermediates on a large scale, such as propargyl alcohol, butynediol, tetrahydrofurane, dihydrofurane, and butyrolactone.

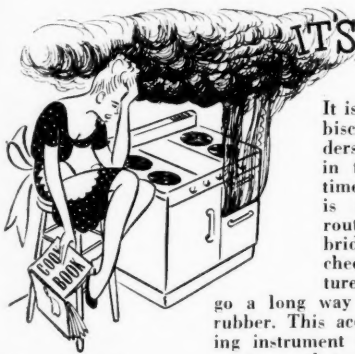
New Machines and Appliances

New Dielectric Heater

Raytheon's Model D5G Raytherm Heater

DIELECTRIC heating that can reduce production costs in almost every industry, including rubber, is now available in the Model D5G, five kilowatt general-purpose Raytherm, made by Raytheon Mfg. Co. Only 71⅝ inches high, 28 inches wide, and 46⅞ inches long, the Raytherm is complete in one cabinet constructed of heavy-gage sheet metal in a welded, structural steel framework and is finished with gray enamel.

Maximum KVA demand from a 230- or 460-volt, 60-cycle, three-phase line is 13.3. Each unit is complete with meters, cycle timer, interlocks, safety switch, and all necessary control circuits for push-button operation. The cabinet, mounted on ball bearing casters, has two handles on the front of the unit to permit ease of movement. Double swinging doors on either side of the unit provide access to the rectifier, oscillator, and output circuits; a swinging door on the front of the unit provides access to the control relays; and a sliding door on the front of the unit provides access to the setup controls. The unit has a maximum kilowatt demand of 12.2, a high-frequency power output rating of five kilowatts, and radio frequencies of 1.7, 3.4, 6.8, and 13.6 megacycles. The capacity range is from approximately zero to 6,500 micro-microfarads.



It is much too late when the biscuits are burned to cinders or when lumps appear in the calender rolls. The time to prevent the damage is before it occurs. The routine use of the Cambridge Roll Pyrometer to check the surface temperature of calender rolls will go a long way in preventing scorched rubber. This accurate, rugged quick-acting instrument is so easy and convenient to use that workmen *will use it regularly*. Send for bulletin 194-SA.

The roll model is for checking surface temperatures of still or moving rolls; the mold type for checking surface temperatures of mold cavities; the needle type for "within - the - mass."

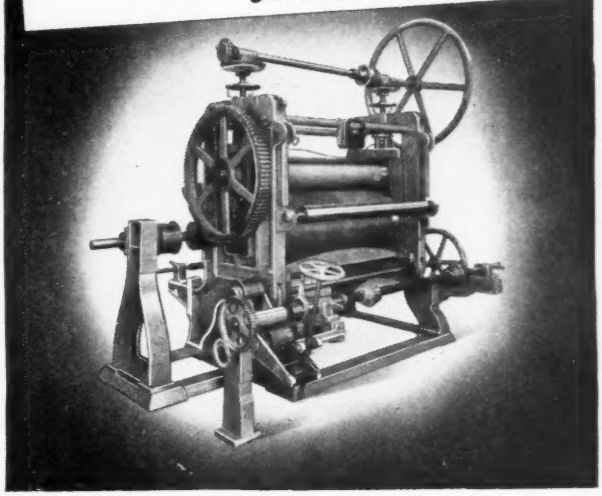
Roll Model

CAMBRIDGE INSTRUMENT CO., INC.
3709 Grand Central Terminal
New York 17, N. Y.

CAMBRIDGE

ROLL • NEEDLE • MOLD PYROMETERS

The Embosser That Regulates and Records Pressure!



WALDRON SUB FRAME EMBOSSING MACHINE

The exclusive regulating and recording features of this modern embosser indicate when equal pressure is being applied on both sides of the machine. Whatever desired pressure is required on either side to compensate for irregularity of goods can not only be maintained for the run but recorded for exactly duplicating on later runs. Machine has other notable WALDRON operating advantages—sub frame that permits quick change of design — anti-friction bearings throughout — automatic stop to prevent possible damage to engraving. Write to us for detailed information.

Among prominent users of WALDRON Embossing Machines are: Bibb Mfg. Co.; E. I. du Pont de Nemours; Fibre Leather Mfg. Co.; Firestone Tire & Rubber Co.; B. F. Goodrich Co.; Kelly-Springfield Tire Co.; Seiberling Rubber Co.; St. Clair Rubber Co., and many others.

JOHN WALDRON CORP.
NEW BRUNSWICK, N. J.

WALDRON · U.S.A.

VULCANIZED VEGETABLE OILS

—RUBBER SUBSTITUTES—

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Types, grades and blends for every purpose, wherever Vulcanized Vegetable Oils can be used in production of Rubber Goods—be they Synthetic, Natural, or Reclaimed.

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A LONG ESTABLISHED AND PROVEN PRODUCT

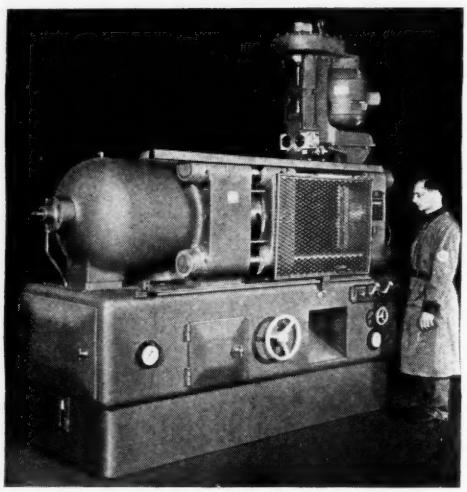
THE CARTER BELL MFG. CO.
SINCE
CARTER BELL PRODUCTS
1903
SPRINGFIELD, NEW JERSEY

Grove Flex-tube Three-Way Valve

Non-Metallic Valve

RECENTLY announced was a new Grove Flex-tube three-way Valve. Employing a flexible molded synthetic rubber tube encased within a Bakelite body, the valve is designed for the handling of all types of fluids, including gases, chemicals, and liquids. It is said to be especially suited for hydraulic or pneumatic cylinder operation. Owing to its unrestricted straight flow characteristics, this unit is most satisfactory for controlling viscous or solids-carrying fluids. Non-metallic construction permits the handling of highly corrosive or erosive liquids or gases.

Manual operation by means of an over-center cam opens and closes the ports at each half turn of the handwheel. A special self-locking feature assures positive tight shut-off over extended periods of time. Available in ⅛- and ¼-inch I.P.S., these new-type valves are furnished for working pressures up to 250 pounds, and maximum temperatures of 150° F. Grove Regulator Co.



HPM Turbojector for Injection Molding of Rubber

Improved Injection Molder

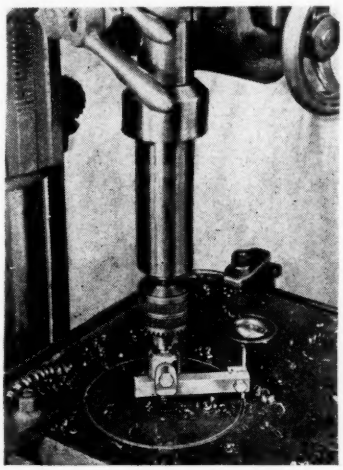
THE HPM Turbojector for the injection molding of mechanical rubber parts has been introduced by the Hydraulic Press Mfg. Co. Designed for production molding of both natural and synthetic rubber, the machine has achieved injection capacities as high as eight pounds per cycle. Production costs are greatly reduced owing to eliminating the need of preforms, automatic filling of the mold, reduction in curing time by as much as 93%, and the elimination of flash to give a minimum of finishing operations. The straight-line hydraulic mold clamp insures positive sealing of mold halves. The machine is fully automatic, requiring little manual effort.

The driving mechanism consists of a 10 h.p., four-speed, high torque electric motor and a train of four gears which rotate the extruding screw at speeds of 48, 72, 96, or 144 r.p.m., depending on the motor speed used. The screw, screw chamber, and baffle gear housing fit directly below the drive shaft of the gear train. The baffle gears act as pressure locks to prevent the rubber being molded from turning with the screw or from baking up into the feed section. By employing an electric resistance band heater, additional heating of the rubber is obtained at the nozzle, accounting for the rapid curing cycles secured with the machine. The nozzle section also contains an automatic check valve to prevent the rubber

from backing up into the screw chamber after the mold is filled. Maximum nozzle contact pressure during injection is approximately 6,000 pounds, permitting injection pressures as high as 18,000 p.s.i. on the material being molded. As soon as the mold is filled, the rubber extruded from the nozzle tilts the injection unit slightly, causing an electrical contact momentarily to reverse the screw, then stop its rotation. The hydraulic ram which tilts the injection unit reseats the nozzle and closes the nozzle check valve. To facilitate changing of molds, the entire injection unit can be tilted hydraulically. The mold space is 21½ inches horizontally and 28 inches vertically. The mold clamp capacity is 450 tons, and the pressure for separating the molds is 26 tons. The maximum daylight opening is 28½ inches. The overall dimensions for the machine are length of 106⅝ inches, width of 40 inches, and height of 111⅛ inches.

Adjustable Circle Cutter

NOW on the market is a new all purpose, adjustable hole-cutting tool, made by Bruno Tools. This unique tool quickly cuts large-size holes in wood, steel, brass, hard rubber, aluminum, fibre, plastics, and problem materials which might otherwise necessitate use of torches or other expensive equipment. The Bruno adjustable circle cutter cuts holes to any diameter from 1⅞ to eight inches through ¼-inch thicknesses in steel or other tough metals and any thickness up to 1½-inch in plastics, fiber, or wood. Thickness capacities may be doubled if cuts are taken from both sides of the material. The tool is designed to operate in any standard drill press, woodworking machine, or suitably mounted spindle machine.



Bruno Circle Cutter

The cutter is designed on a new principle which permits easy, yet extremely accurate adjustment. It consists of a combination drill and pilot with a new, improved high-speed cutting blade, adjustable to depth and diameter. The exclusive Wedge-lok cutting blade holder permits cutting edge to recede or yield from work while still maintaining steady pressure and feed. The cutting blade is easily resharpened without special tools by grinding on one edge only. The twin-blade holder, with a fixed ½-inch center, cuts washers, wheels, disks, and gaskets in one operation.

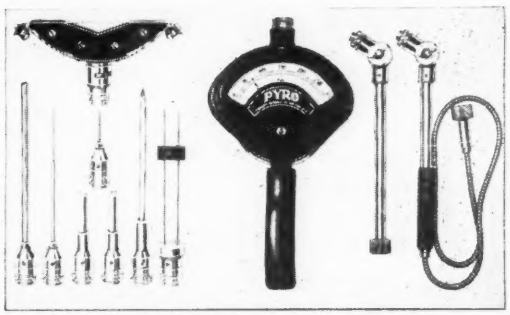
Maintenance-Free Level Control

PHOTOSWITCH, INC., has announced its Level Control Series 10, making available to the chemical, sanitary, sewage, and refrigeration fields a series of rugged maintenance-free relays for the level control of all electrically conductive liquids. Contact with the liquid is made only by a stainless-steel probe rod, as there are no floats, bellows seals, or stuffing boxes. With alternating current used in the probe circuit, no electrolytic action is possible, and mica insulated probes insure against leakage.

The only floatless level control containing no vacuum tubes and operating with low voltage in the probe circuit, it is recommended for the control of water, milk, beer, ammonium chloride, copper nitrate and sulfate, sodium chloride, potassium hydroxide, and many other acid, base, and salt solutions. Selection from four terminals on the terminal block enables the control to be matched to the specific resistivity of a material.

In operation, the liquid to be controlled makes or breaks contact with the probe rod and transmits to the control a minute

(*Continued on page* 444)



The NEW ALL-PURPOSE PYRO Surface Pyrometer

Designed to meet all plant and laboratory surface and sub-surface temperature measurement requirements in the Rubber Industry—one instrument with a selection of eight types of thermocouples and rigid and flexible extension arms—all interchangeable within a few seconds without recalibration or adjustment.

The NEW PYRO is quick acting, light weight, and rugged. It features a large 4¾" indicator, automatic cold end junction compensator, and a shielded steel shock, moisture- and dust-proofed housing—all combined to offer the highest precision accuracy, dependability, and durability. Available in five standard ranges from 0-300° F. to 0-1200° F.

Write for the New Catalog :160—It will interest you!

THE PYROMETER INSTRUMENT COMPANY

Plant & Laboratory

105-R Lafayette St., New York 13, N. Y.

Manufacturers of PYRO Optical, Radiation, Surface, and Immersion Pyrometers for Over 25 Years.

The term

"COTTON FLOCKS"

does not mean cotton fiber alone

EXPERIENCE

over twenty years catering to rubber manufacturers

CAPACITY

for large production and quick delivery

CONFIDENCE

of the entire rubber industry

KNOWLEDGE

of the industry's needs

QUALITY

acknowledged superior by all users are important and valuable considerations to the consumer.

Write to the country's leading makers for samples and prices.

CLAREMONT WASTE MFG. CO.

CLAREMONT N. H.

The Country's Leading Makers

MAGNESIA

MAGNESIUM CARBONATE

•

MAGNESIUM OXIDE

EXTRA LIGHT

The Original Neoprene Type.

A supreme quality product for the rubber trade. Extremely fine state of division. Improves storage stability and resistance to scorching. A curing agent unexcelled for increased modulus, greater resilience, reduced heat build-up, lower compression set and retention of tensile strength during heat service.

LIGHT

A high quality product of greater density than "Extra Light," but high in MgO and low in impurities. An excellent value for many uses.

MEDIUM

A good value. Very active. High Magnesia content, low in impurities. Medium density.

HEAVY

All types can be furnished. Specially ground to meet the exacting Code Pigment Specifications of the Rubber Trade. Unground types for chemical uses.

PACKAGES—Specially designed to protect contents from moisture and air. Corrugated cartons with special asphalt laminated moisture-proof liner, and inner paper liner. Five-ply multi-wall bag, including special asphalt laminated moisture-proof liner.

Special Service for All Requirements of the Rubber Trade

GENERAL MAGNESITE & MAGNESIA COMPANY

Specialist in Magnesia

MANUFACTURERS—IMPORTERS—DISTRIBUTORS

Architects Building,
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AKRON—The C. P. Hall Co.

BOSTON—The C. P. Hall Co.

BUFFALO—Commercial Chemicals, Inc.

CHICAGO—The C. P. Hall Co.

DENVER—The Denver Fire Clay Co.

DETROIT—C. L. Hueston

LOS ANGELES—The C. P. Hall Co. of California

MONTREAL—Canadian Industries, Ltd.

NEWARK, N. J. — Chas. S. Wood & Co., Inc.

PORTLAND, ORE. — Miller & Zehrung Chemical Co.

ST. PAUL, MINN.—George C. Brandt, Inc.

SEATTLE, WASH.—Carl F. Miller & Co.

TRENTON, N. J. — General Supply & Chemical Co.

FAR EAST

MALAYA

Production has apparently begun on some European estates, but it is evident from various discussions that they have had anything but smooth sailing. Apart from the effort involved in rehabilitating their estates and the difficulties caused by shortage of labor, planters found their first efforts severely hampered by the depredations of armed gangs of robbers who not only stole crops of rubber before they could be transported, but killed or wounded those unfortunate enough to cross their paths. These robberies assumed such proportions that it was found necessary for the police to obtain assistance from the army.

More recently complaints have been heard about the delay in delivering to estates much needed supplies of acetic and formic acid for coagulating latex. In the latter part of March the first shipment of such acids had not yet been made.

Following the reoccupation of Malaya, the Custodian of Enemy Property took over considerable quantities of centrifuged latex prepared in the Dunlop estate factories during the Japanese occupation. The latex was stored in bulking tanks, and most of it seems in good condition. All the latex is eventually to be shipped out, and the first bulk shipment of 50,000 gallons has already been made.

The Dunlop estates were to have resumed production on a commercial scale in April. The company's centrifuging equipment has been completely overhauled, and provided the necessary labor is available, it could produce enough latex to meet the needs of the United Kingdom at the prewar level. Since drums are hard to obtain at present, practically all the latex will probably be shipped in bulk through the Dunlop installation at Singapore, which meantime has been put into full working order again. From there the latex will go to the Dunlop installation at Liverpool, where, as the property of the government, it will be distributed to consumers in accordance with allocations made by the Rubber Directorate.

The Economic Adviser to the Malayan Union Government, C. J. Pyke, in a first official statement on the rehabilitation of the Malayan tin and rubber industries, said that he expected that by the end of the current year, rubber output in Malaya would be back to about 70% of prewar level. He revealed that the Ministry of Supply had furnished equipment to the value of £1,000,000 to small-holders and rubber estates owned by Chinese.

Reports from other sources are equally favorable. However the shortage of labor and the lack of adequate transportation facilities are still limiting factors that must be reckoned with.

From Singapore comes the news that thousands of tons of rubber that should be going from Sumatra to America are being smuggled into Malaya instead.

In accordance with agreements made after the Japanese surrender, all rubber available for export from the Netherlands India was allocated to the United States, in addition to certain amounts from Malaya. But the Dutch are reportedly refusing to buy rubber from the Indonesians, claiming that much of this rubber has been looted, while they further take the stand that they do not want to put money into the hands of the very people who are opposing the resumption of the *status quo* in the territory. As a result, not only are the Dutch losing revenue, but America has been receiving less rubber than she expected. It is estimated that as much as 10,000 tons of rubber have been smuggled from the Netherlands India into Malaya where, apparently, America has no claim to it.

CEYLON

The botanical and mycological department of the Rubber Research Scheme, Ceylon, states the following in the report of the work of the research board in 1944:

Oidium leaf disease again was very severe in all rubber districts. On some low-country estates leaf fall was said to have been the worst ever experienced, and damage was also

reported on estates not previously affected. Fortunately the attack was of short duration.

On certain mid-country estates young budded trees were severely damaged by *Diplodia* die-back following attack by *oidium;* during the year young budded rubber also showed greater susceptibility to Brown Bast, an increase having been reported in the number of cases occurring in young budded areas.

Studies of clones and selected seedlings with a view to developing new superior clones and high-yielding seedling families were continued during 1944. Six new clones derived from Prang Besar seedlings were selected for testing on a large scale during 1945, with Tjirandji I as control clone. Hand pollinations carried out in 1944 on various local and imported clones gave disappointing results—out of 12,422 pollinations, only 162 fruits were harvested, an average success of 1.3%. Best results were obtained with trees of PB 5/139, from which the successes obtained for 304 pollinations figured out at 20.4%.

It is known that budgrafts derived from buds taken low down on the seedling stem resemble seedlings more than the normal budgrafts. The stem is corky, more conical, and the union not so marked. Though it is not thought likely that this property will have commercial significance, the possibility that it might introduce a bias into selecton results led to a decision to set up small-scale experiment to compare budgrafts from buds on high and low sections of the main stem below the first branch with budgrafts from branch buds.

The Rubber Research Institute in Malaya had found that an increase in yield could be obtained if oils were applied to the bark below the tapping cut after preliminary grooming or scraping, and experiments along these lines had also been started in Ceylon. The fourth of a series of such experiments to determine the effect on yield of the treatment was started in January, 1944. Trees were scraped for 12 and six inches below the tapping cut, and some were treated with coconut oil and others with mineral oil. Better results were reported where scraping was carried out over 12 inches of the bark, and coconut oil was used; an increase of 1.8 pounds per tree over the control was thus obtained. However, though this treatment has thus been proved to increase yield, it seems to have an undesirable effect on the bark, and until the full extent of the results of treatment on the health of the bark is known, the method cannot be recommended.

JAPAN

Allotments of 6,000 metric tons of crude rubber from military stocks and 1,590 tons from civilian stocks have been approved by SCAP for the production of critical items. However the shortage of such materials as gasoline, benzol, and coal makes it unlikely that much more than 50% of the scheduled output will be realized for consumer goods like rubber-soled socks, boots and shoes, tires and tubes for auto-

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The Japanese synthetic rubber industry was said to have had an annual capacity of 750 metric tons, but actual production does not seem ever to have exceeded the 220 tons attained in 1944, says a military government report on industry in Japan and Korea. The synthetic rubber was reserved solely for military uses, 95% going into the manufacture of self-sealing gas tanks for aircraft. The industry is not now operating; the prohibitive costs of more than 100,000 yen per ton alone would be sufficient reason for stopping it, if there were no other reason.

NEW ZEALAND

In the first ten months of 1945, New Zealand imported tires for motor vehicles with a total value of £NZ 74,151 from the United States, against £NZ 4,083 in October, 1945. A factory to produce a full range of tires is to be built on a 40-acre tract in the upper Hutt Valley, 20 miles from Wellington. Machinery and equipment will be supplied by the United Kingdom, and British countries will, so far as is possible, also furnish necessary raw materials.

LATIN AMERICA

COLOMBIA

Colombia imported 56,407 pounds of synthetic rubber in January, 1946, compared with 1,184 pounds in December, 1945, when 1,565 pounds of reclaimed rubber also were imported. Purchases of rubber manufactures included 1,427 automobile tires in December, 1945, against 1,897 in January, 1946; 772 automobile tubes against 783; 3,888 truck and bus tires, against 699; 390 truck and bus tubes, against 711; 1,951 pounds of belting, plus a shipment value at $875, against 16,202 pounds; 28,486 pounds of hose, plus a shipment value at $1,039, and 1,737 pounds of synthetic hose, against 33,424 pounds; 4,735 pounds of packing against 5,825 pounds; and other rubber products valued at $4,586.46, against $15,129. The tire imports in December, 1945, also included 15 tires and 15 tubes for airplanes. Most of the tires and tubes for automobiles, trucks, and buses came from Brazil, but the other manufactures were supplied by the United States.

Two new tire factories began to operate in Colombia in October, 1945. One, established at Cali, is said to have a capacity of 1,200 tires a month, but it is not expected to achieve this for some months to come. The other company, known as Industria Colombiana de Llantas, was supposed to produce 2,500 tires a month starting from April and to reach full capacity of 5,000 tires a month by the middle of the current year.

COSTA RICA

Practically all the rubber produced in Costa Rica is wild rubber from *Castilla* trees growing in the jungles and until 1944 consisted of so-called "scrap" rubber. However starting in January, 1944, and continuing through October, 1945, the product was marketed in the form of washed and dried crepe. Exports in the years 1942-1945 inclusive show a varying trend,

having been 241.5, 386.8, 243.6, and 274.2 metric tons in 1942, 1943, 1944, and 1945, respectively. The 1945 figures included 10 tons of *Hevea* rubber from a 2,500-acre plantation which recently came into production. For 1946 not more than 12.5 short tons are expected from this source, but when the plantation is in full production, which will not be before 1953, the yield is expected to reach 1,000 pounds an acre, or a total of 1,250 short tons a year.

Outputs of wild rubber are expected to drop sharply in 1946 and may not be more than 125 metric tons for the year.

In the earlier war years Costa Rica's entire rubber crop went to the United States, but in the last three years about 30 tons a year were allotted to a local factory making ponchos, tennis shoes, balls, etc.

BRAZIL

Exports of crude and manufactured rubber by Brazil in the first 11 months of 1945 included 15,518.2 metric tons of crude rubber, 2,892.8 tons of guttas, balata, and the like, 2,985.8 tons of tires, 256.2 tons of inner tubes, and 1,113 tons of other unspecified rubber manufactures. Practically all of the crude material went to the United States, but most of the manufactures was sent to other South American countries, chiefly to Chile and Ecuador.

During the first 10 months of 1945, Brazil imported 29 metric tons of rubber hose and tubing, 50 tons of tires, and 17 tons of inner tubes. The United States supplied 23 tons of the tubing, 48 tons of the tires, and all of the inner tubes that were received into Brazil.

BRITISH GUIANA

There was a marked decline in exports of crude rubber and balata from British Guiana in 1945 as compared with 1944. In the latter year crude rubber shipments came to 288,570 pounds and balata shipments, to 984,274 pounds; the respective 1945 figures were 250,256 and 646,580 pounds, representing a decline for rubber of 13% and for balata of 34%. All rubber exports went to the United States, but the bulk of the balata was sent to the United Kingdom.

SURINAM

There was a slight decrease in the production of balata in Surinam in 1945, when 425,472 pounds were received from the interior, contrasted with 428,581 pounds in the preceding year. Prices were about 6¢ (United States currency) higher in 1945 so that the total value actually was above that which was recorded in 1944.

BELGIAN CONGO

Planting of *Hevea* rubber in the Belgian Congo is reportedly progressing favorably. In 1945 an additional 2,275 acres were planted in the territory of Lomela, bringing the total acreage in the territory under Hevea to 9,480 acres. Tapping is to be commenced on 750 acres planted in 1941.

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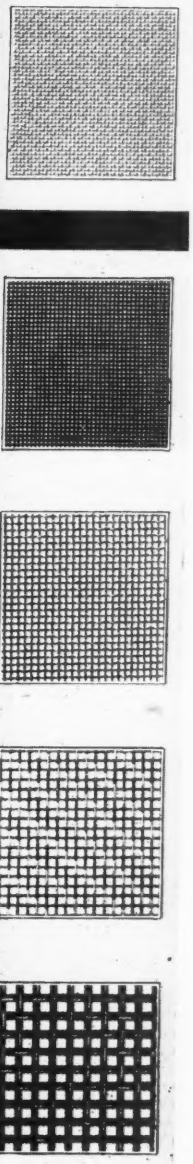

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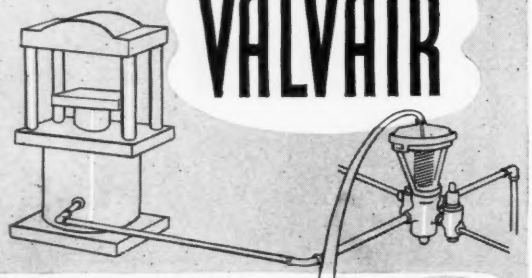

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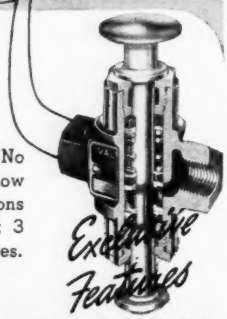

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EUROPE

GERMANY

From a recently issued military government report on conditions of industry in Germany, it appears that rubber factories in the United States zone are operating to the fullest extent permitted by available supplies of raw materials. The Buna shortage continues to be acute, it is reported, and of 325 tons which should have been received in January, 1946, from the Ludwigshafen factory, not a single ton has yet arrived. But some shipments are expected shortly.

At present main emphasis is on the production of automobile and truck tires and tubes in the most urgently needed sizes.

One-half of an order for conveyer belting for the Saar coal mines has been filled, leaving a further 6,000 meters to be made. The output of rubber soles, heels, boots, and miscellaneous industrial rubber articles showed a substantial increase in January, 1946, over December, 1945.

SWITZERLAND

Switzerland was able to obtain 218.6 metric tons of crude rubber in December, 1945, of which 215 metric tons came from the United States.

The well-known Swiss chemical concern, Ciba, reports a marked decline in exports of plastics owing to the difficulty of obtaining raw materials and to the various hindrances restricting foreign deliveries. However the concern was able to make up this lack to some extent by improving the home market for this type of goods. The company has been aiming at the production of new goods and to this end systematic scientific research has been sustained. Of the newer goods may be mentioned the "Melocol" adhesives which, it is claimed, have become widely known because of their outstanding qualities. At the Monthey factory the production of indigo was reduced; at the same time the manufacture of plastics was transferred to this plant, which even had to be extended somewhat to accommodate the new manufacturing ventures.

SWEDEN

By the end of 1946, Sweden expects to be able to contribute substantially toward satisfying home demands for tires. These must at present largely be filled by imports, but it is expected that the new tire factory now in course of construction for Trellenorgs Gummifabriks A.B., leading Swedish rubber manufacturer, will go into production during the latter half of 1946 and that then the factory will be in a position to raise Sweden's total productive capacity for average size tires to about 2,000 daily. Annual demand is estimated at about 600,000 tires.

EIRE

Crude rubber imports into Eire in the first 11 months of 1945 totaled 1,388 long tons, against 1,479 tons in the corresponding period of 1944, and also included synthetic rubber. During the first nine months of 1945, imports of manufactured goods included: rubber in sheets, threads, and the like, 61 tons, against 18 tons in the same period of 1944; piping and tubing (including armored), 32 tons, against 11 tons; pneumatic tires for cars and tractors, 616 against 102 units; bicycle tires, 28,002 against 12,338 units; solid tires to a value of £1,403 against £664; and other manufactures, to a value of £146,631, against £52,712.

Editor's Book Table

BOOK REVIEWS

"Journal of Polymer Science." Editorial Board: P. M. Doty, R. Houwink, H. Mark, and C. C. Price. Interscience Publishers, Inc. and Elsevier Publishing Co., Inc., New York, N. Y. Bimonthly. 7¼ by 10¼ inches. Volume I, about 640 pages. Subscription, $8.50 per year. Foreign postage $1.00, including Canada. Issues 1 and 2.

This new journal, devoted to the advancement of fundamental knowledge on the physics and chemistry of polymers, offers to scientific workers in the field an opportunity to report experimental and theoretical contributions through a centralized medium. It will be the editorial policy to encourage freedom of discussion and to provide prompt publication.

Journal of Polymer Science will publish original papers, review articles, brief communications to the editors, and book reviews. The new journal is an outgrowth of and a successor to the *Polymer Bulletin,* which has ceased to appear.

The new journal reflects the consolidation of independent plans of the Elsevier Publishing Co., Inc., Amsterdam, Holland, and Interscience Publishers, Inc., New York to publish separate journals on the same topic. To avoid the co-existence of two journals devoted to the field of high polymers, both publishers have coordinated their plans, and the outcome is the *Journal of Polymer Science.* Since these plans could not be realized before the appearance of Issue 1, this issue was published under the title of the *Journal of Polymer Research;* but in the future there will exist only one journal, called the *Journal of Polymer Science.*

The Journal will be international in scope. A number of leading scientists in the field have been invited to form an advisory board, which represents all the important centers of polymer research in the United States and abroad, as well as scientific societies and their divisions whose fields of activity are within the scope of the journal. All papers will be published in the English language.

The publishers are willing to provide further information and supply sample copies on request.

"The Engineer in Society." John Mills. D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y. Cloth, 5⅜ x 8 inches. 224 pages. Price $2.50.

This book is an eminently practical one on the outlook for advancement of engineers and research men in industry. Based on the 45 years of experience of the author and the knowledge gained while he was employing engineers and evaluating their success, the book gives a practical insight into industrial policies affecting engineers. Using examples and illustrations of cases in his past experience, Mr. Mills gives information

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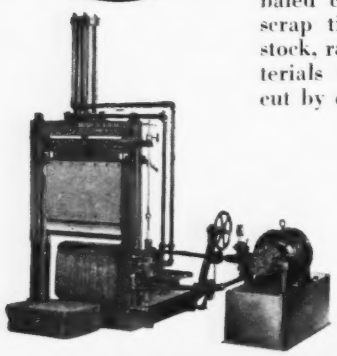

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on the personnel policies of the technological industries and tells how to make a more efficient utilization of scientific training, both in technology itself and in other fields of human activity, such as educational, social, and political.

The book is divided into five sections. The first, "What Manner of Men," comprises five chapters discussing the classification of engineers on the basis of their scientific, intellectual, and emotional traits, their division into research and application engineers, and the importance of aptitude tests for proper placement in industry. The second section, "Scientists Gone Executive," on the trend of promotion from research to management, is a provocative discussion decrying the belief in transfer of superior research ability to executive ability, illustrated by the need of executive intuition as opposed to research factuality. "Salary Curves" is the title of the third section, which covers pay policies and curves for research personnel as opposed to management, management's ideas on technical employment, and its approach to the problem. The fourth section, "A Course for Action," discusses the caste system among scientists based on education, the value of an advanced degree to industry, the role of women in science, the need of technical class consciousness to differentiate engineers from management and labor, the organization of scientists, and the advantages and disadvantages of scientific societies from the point of view of the individual engineer. The last section, entitled "Exposition for Engineers," considers modes of expression for engineers and gives suggestions for writing reports and some simple rules on achieving clarity and persuasion by technical reports from an industrial angle.

Highly readable, the book reveals the various hidden workings of industrial organizations that affect engineers, does much to eliminate and disprove misinformation and incorrect beliefs prevalent among industrial scientists, and provides provocative and stimulating ideas for enabling the engineer to find his proper place in industry and society.

"1946 Modern Plastics Encyclopedia." Plastics Catalogue Corp., 122 E. 42nd St., New York 17, N. Y. Cloth, 8 by 11¼ inches. 1390 pages. Price $6 in U. S. A.; $7 in Canada and other foreign countries.

This issue of the encyclopedia, formerly the "Plastics Catalog," is again a comprehensive and up-to-date guide to the manufacture and use of plastics. In place of the concern with wartime plastics shown in the past four issues, this edition has a postwar theme. Accordingly, the introductory section, preceding the book's 12 basic sections, is entitled "Plastics Panorama" and gives an illustrated review of the industry, the many applications of plastics in different fields, and tables of plastics production and sales. The section on technical data has been greatly expanded, as have been the other sections, and provides a condensed engineering handbook on plastics. The scientific level of the book has again been raised, with considerable emphasis given to technological aspects throughout each section.

In the materials section, 53 articles cover all the commercial molding, extruding, and casting compounds. There are a new chapter on casting resins and timely information on the newer resins such as the allyls, unsaturated polyesters, silicones, furanes, expanded plastics, and polyethylene. Also enlarged and revised are the sections on engineering design, machinery and equipment, laminates and vulcanized fiber. The section on fabricating, finishing, and assembly is given a new treatment, and much new material has been added to the sections on coatings and synthetic fibers. An innovation is the separation in a special envelope of the ten exclusive charts and tables, newly revised, covering such subjects as plastics properties, plastics flow charts, plasticizers, etc. As in previous issues, there is a bibliography of books and articles on plastics; a glossary of definitions of plastics terminology; and a directory section on the industry.

The section on synthetic rubber and rubber-like plastics has been expanded to 25 pages and gives detailed information on butadiene copolymers, chloroprene polymers, isobutene polymers, isobutene-diolefin copolymers, organic polysulfides, vinyl polymers, styrene elastomers, polyester elastomers, cyclorubber and silicone rubber. One of the supplementary charts is devoted to the properties of synthetic rubbers and elastomers, based on data submitted by the manufacturers or published in technical literature, and includes Butaprene NXM, NL, and NF; Hycar OR-15, OR-25, and OS-10; Ameripol Types D and F; Chemigum N-1, N-2, N-3, and S; Neoprene Types GR-M, GR-M-10, GN-A, E, M, FR, KNR, and CG; Resistoflex Compar; GR-S; GR-I; GR-M; Perbunan Types 18, 26, and 35; Butyl; Vistanex; and "Thiokol" Types A, FA, and ST.

NEW PUBLICATIONS

"Injection Molding and High Temperature Press Curing of Natural and Synthetic Rubbers." R. T. Vanderbilt Co., Inc., 230 Park Ave., New York 17, N. Y. March 15, 1946. 47 pages. As stated at the beginning of this booklet, which represents the first publication of this sort on the injection molding and high temperature press curing of rubber, it was written in anticipation of a trend to higher curing temperatures and shorter molding cycles which may be made possible by mechanical improvements in equipment and the application of new heating methods. The booklet reports findings on high temperature press curing in the Vanderbilt laboratory and at the Monroe Auto Equipment Co., where an injection molding press was made available for experimentation. Reference is made to the fact that recently a number of progressive manufacturers have given consideration to the possibility of increasing the efficiency of rubber molding operations and have investigated the application of transfer and injection molding principles to rubber fabrication with encouraging results.

Following a description of the equipment used in the Vanderbilt laboratory, consisting of a battery of quick closing hydraulic presses with electrically heated platens, and the Monroe injection machine, the major portion of the report is concerned with physical test data on curing conditions at temperatures up to 500° F., both in presses and in the injection molding machine. Items covered in the booklet include physical properties *vs.* curing temperature, 300 to 500° F.; the effect of preheating; physical properties *vs.* thickness of slabs; effect of curing temperature on heat aging; effect of varying accelerator and sulfur contents; sulfurless vulcanization; comparison of carbon black loadings; effect of Kalvan and Dixie Clay; effect of plasticizers; injection molding *vs.* laboratory press curing of GR-S at 300 and 400° F.; and experiments with GR-M, GR-I, and reclaim. The vulcanization of natural rubber with and without sulfur at 400° F. is also described.

"Lend-Lease Supplement to Foreign Commerce and Navigation of the United States, Calendar Year 1942. Table No. 4-A." Bureau of the Census, United States Department of Commerce, Washington, D. C. For sale by the Superintendent of Documents, Washington, D. C. 72 pages. This supplement contains listings of exports of domestic and foreign merchandise under the lend-lease program by commodities and by countries. Of interest are the listings of shipments of natural and synthetic rubbers and latices and products made therefrom; synthetic yarns and their products; synthetic resins and plastics; and clays, chemicals, pigments, minerals, and miscellaneous rubber compounding ingredients.

Technical bulletins of the Socony-Vacuum Oil Co., New York, N. Y. **"Socony-Vacuum Plasticizers for Synthetic Rubber."** October, 1944. 20 pages. After a brief review of the major synthetic rubbers, their properties, and applications, the bulletin gives information on the use of S/V Sovaloids A, C, L, N, R, and S as plasticizers. Physical properties of the Sovaloids are given together with formulations in different synthetic rubbers and table of properties imparted to vulcanizates. There is also an appendix on the significance of test procedures for petroleum products, especially those used in rubber compounding. **"S/V Product 2243**—Sun-Checking Wax for Synthetic Rubber (GR-S)." April, 1945. 2 pages. This bulletin discusses sun-checking of natural and synthetic rubbers, its prevention, and the history of the use of sun-checking waxes. Properties of S/V Product 2243 are given together with information on its use and performance.

"Industrial Research Progress at Armour Research Foundation of Illinois Institute of Technology, 1944-45." Armour Research Foundation, Chicago, Ill. 20 pages. This, the Foundation's ninth annual report, gives a general review of the Foundation's purpose, growth, and technical achievements in the year 1944-45. Technical projects under way covered the fields of chemistry and chemical engineering, metals and ceramics, physics, mechanics of solids, fluid mechanics and thermodynamics, electrical engineering, and engine and lubri-

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MEYER & BROWN CORP.

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cants. The work includes a project sponsored by the Wyandotte Chemical Corp. on the dispersion of calcium carbonate in carbonate-reenforced rubber, and a project sponsored by the Goodyear Tire & Rubber Co. on the reduction of V-belt running noise.

"Plastics Work Miracles with Textiles." Riverside & Dan River Cotton Mills, Inc., Danville, Va. 16 pages. The company's fiber bonded process for treating textile yarns, rovings, and fabrics with synthetic resins to improve strength and other qualities is described. The bulletin contains sections on the process and its operation, the machine use for application of the resin, advantages of the process and data on improvement in properties, photomicrographs of treated cords and rovings, and a list of typical applications including belting fabrics and plied rayon yarns.

"The Huber News." March, 1946. J. M. Huber, Inc., New York, N. Y. 20 pages. This issue of the company's house organ continues the series of articles on the Borger, Tex., plant and describes carbon black manufacturing processes. There are also plant and personnel notes from the company's plants at Boston, Georgia, Chicago, New York, Brooklyn, St. Louis, and Borger.

"They Were Dependable." Airship Operation, World War II, 7 December 1941 to September, 1945. Naval Airship Training and Experimental Command, U. S. Naval Air Station, Lakehurst, N. J. April 1946. 56 pages. This illustrated booklet gives a general cross-section of naval airship activities in World War II, but a more complete history of airships in the war is in process of preparation. Starting with a description of airships and facilities at the onset of the war, the growth of the naval airship fleet is shown together with their duties and the results obtained, particularly in the anti-submarine campaigns and in reconnoissance.

"Testing Plastic Parts." The Society of the Plastics Industry, Inc., New York, N. Y. 20 pages. This is the fourth chapter of the technical handbook being developed by the engineering and technical committee of SPI and is designed to guide the setting up of performance tests for plastic parts. Besides a foreword and general considerations on testing principles, there are sections on tests for impact, moisture resistance, dimensional stability, effect of temperature, crushing, and various miscellaneous tests.

"1946 Truck—Bus Handbook." The Tire & Rim Association, Akron, O. 50 pages. Price $1. This issue of standards covers tire loads and inflations, general data, rim contours, valve dimensions, and rim inspection for trucks, buses, trailers, light trucks, house trailers, platform trailers, cranes, shovels, mining cars, earth moving vehicles, and road graders.

"Koroseal—The *Modern* Flexible Material for Industry." B. F. Goodrich Co., Akron, O. 20 pages. This illustrated booklet gives a short history of the development of Koroseal, outlines its resistance to various destructive elements, gives a discussion of the mechnical and physical properties of the various types, and lists the forms in which the material is available. Numerous industrial applications are described together with consumer uses of the material.

Publications of the Standard Chemical Co., Akron, O. **"Use of Resinex L-4 in GR-I 70."** April 17, 1946. 2 pages. This is a supplement to an earlier report on the use of Resinex L-4 in Butyl. The effect of adding increasing amounts of L-4 on plasticity of GR-I-60 and GR-I-70 is shown, together with charts of the physical properties of the vulcanizates. Some data also appear on the properties of L-4, and information is included on its availability and cost. **"Resinex L-4 in Tire Compounds."** April 18, 1946. 4 pages. This bulletin gives information on the use of Resinex L-4 as a plasticizer in GR-S tire compounds. There are data on formulation and physical properties of vulcanizates at various curing cycles showing the effect of this

material as compared with several other plasticizers. **"Low Cost Resinex Compounds."** April 30, 1946. 2 pages. Instead of using Resinex as a plasticizer for rubber compounding, this bulletin gives compounding and processing data on the use of small amounts of rubber hydrocarbon as a plasticizer for the resin itself in the production of floor mats, stair treads, bumpers, grommets, and similar inexpensive products. **"Resinex in Mechanical Goods Compounds."** May 1, 1946. 4 pages. This bulletin gives formulations and physical properties for the use of Resinex as a direct replacement for reclaimed rubber in GR-S compounding, and as a direct replacement for substantial amounts of GR-S itself.

"Simplex-Plastex." Data Sheet 114. Simplex Wire & Cable Co., Cambridge, Mass. April, 1946. 4 pages. This bulletin describes the various Plastex polyvinyl chloride-type wire and cable insulations and jackets. Some of the questions frequently asked about the material are given together with their answers. In addition is a table listing the properties of the different types of insulations and jackets.

"Rubber Press." Vol. IV, No. 4. April, 1946. Chicago Rawhide Mfg. Co., Chicago, Ill. 36 pages. This issue commemorates the tenth anniversary of the company's synthetic rubber division. The magazine contains photographs of the division's personnel, reviews of the functions of the different departments, and has stories on the growth of the division. In addition are social items and a review of the sports activities of division members.

"Vinylite Plastics—Elastomeric Compounds." Bakelite Corp., New York, N. Y. 20 pages. After a brief discussion of what the Vinylite elastomeric compounds are, this booklet devotes sections to molding compounds, extrusion compounds, flexible sheeting and film, and cloth-coating resins. Illustrated descriptions appear in each section on the applications of the resins. Presented also are tables giving the average physical and chemical properties of typical compounds covered in each of the preceding sections.

"Report of Conference on Post-War Preparation and Packing of Rubber." London Advisory Committee for Rubber Research, Imperial Institute, London, South Kensington, S. W. 7, England. 31 pages. This booklet gives the report of the conference between representatives of English rubber manufacturers and trade organizations on suggested improvements in preparation and packing of plantation rubber. The comments of American rubber manufacturers are also given, as obtained through The Rubber Manufacturers Association, Inc. Of special interest in the "Conclusions" are the following: smoked sheet must continue to be the main product for the time being; all rubber exported from Malaya should, for a period, be marked "Emergency rubber;" methods of packing rubber are, on the whole, unsatisfactory and require further study; alternatives to smoked sheet as the main product considered are fermented rubber, spray-dried latex and rubber produced by a continuous process; and suggestions for the development of special types of rubber for specific purposes, such types including rubber softened by peptization, rubber-carbon black mixtures, purified rubber, rubber powder, pale sheet equivalent to pale crepe, and formaldehyde rubber.

Publications of Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago 11, Ill.: **"Bi-Monthly Supplement to All Lists of Inspected Appliances, Equipment, Materials."** February, 1946. 44 pages. **"Underwriters' Laboratories, Inc., Annual Report, 1945."** 20 pages. Publications of The British Rubber Producers' Research Association, 48 Tewin Rd., Welwyn Garden City, Herts, England: No. 65. **"Contributions to Symposium on Breakdown of Rubber.** (i) Oxidative Breakdown of Rubber." E. H. Farmer. (ii) "Photochemical Breakdown of Rubber." L. Bateman. (iii) "Thermal Breakdown of Rubber." J. L. Bolland and W. J. C. Orr. 24 pages. No. 66. **"Rubber, Polyisoprenes and Allied Compounds.** Part VIII. The Formation of Dialkyl Sulfide Dihalides and Its Bearing on the Problem of Determining the Unsaturation of Vulcanized Rubber." George F. Bloomfield. 6 pages. **"Let's Look at the Record."** Norman Damon, Automotive Safety Foundation, 366 Madison Ave.,

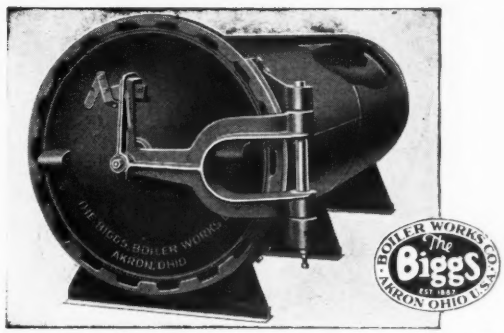

Fig. 17. Welded horizontal steam-jacketed vulcanizer with hinge-type quick-opening door: all sizes, various working pressures. No need of supporting inner shell with stay-bolts, less maintenance.

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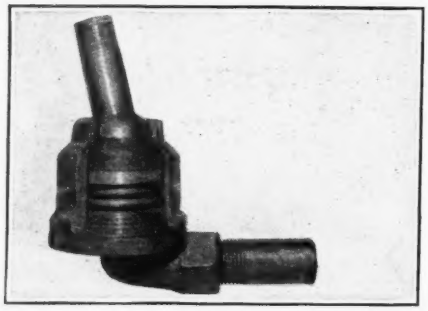

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New York 17, N. Y. 20 pages. **"Pittchlor—Ideal for Use as a Bleach, Germicide, Disinfectant."** Pittsburgh Plate Glass Co., Pittsburgh, Pa. 4 pages. **"To Our Sponsors."** Francis Goodwin, Armour Research Foundation of Illinois Institute of Technology, Chicago 16, Ill. 34 pages.

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(*Continued from page 373*)

jects treated include: types of German Buna, compounding ingredients, plasticization and variability of Buna, use of synthetic rubber in cables, processes of tire production, textiles, tire construction and performance, reclaiming synthetic rubber, Buna synthetic latices, and Buna milking machine liner. Appendices contain lists of documents and raw materials obtained, list of principal German and Austrian cable manufacturers, tire compounding data, cable mixings, results of examination of samples of rayon from Aachen and Liege and of examination of a Buna milking machine liner.

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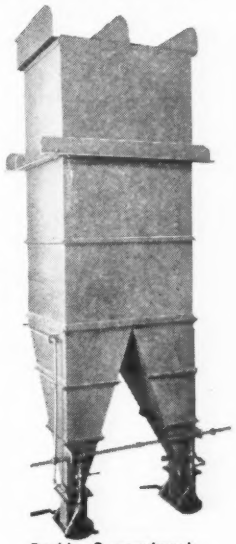

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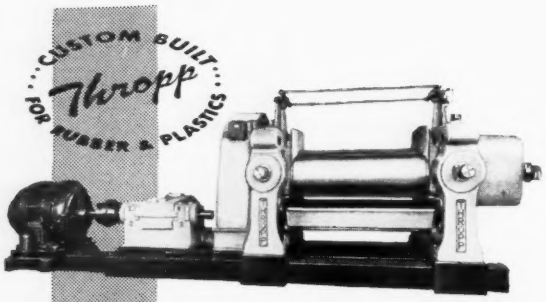

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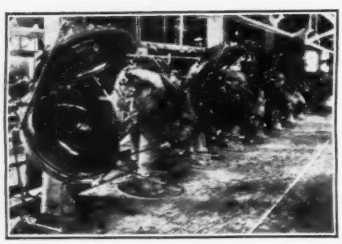

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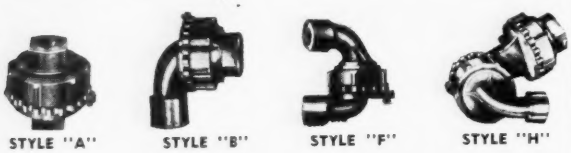

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Harburger Gummiwaren-Fabrik, Phoenix, A.G., located in Harburg near Hamburg. E. T. Handley, S. F. Hingeley, and N. R. Rowzee. 1945. 117 pages. Mimeo. 75¢. This is an account of a visit in May, 1945, with information on the following aspects of the Phoenix plant: thermal softening of Buna, physical testing, production of reclaim, tire building, mill-room equipment, tire scrap reports, tire cost information, manufacture of footwear, use of Desmodur R, and manufacture of bicycle tires. Also included is a general survey of the German rubber industry, based on interviews with Otto A. Friedrich, of Phoenix, prepared by E. R. Rowzee. Besides there are reports on the New York-Hamburg, Gummiwaren-Fabrik, H. Ruse & Co., and other aspects of the Phoenix plant.

Maintainance-Free level Control

laneous Chemicals. Russell Hopkinson and others. 1945. 129 pages. Mimeo. 75¢. This report contains detailed information on three Continental plants in the Hanover district: main plant is Vahrenwalderstrasse; others are Excelsior Works at Limmer, and Nordhafen Plant at Stocken. Formulae and processes, and design and construction of tires and other rubber products are given as well as statistics of rubber consumption and tire production. In addition to tires other products produced were: V-, conveyer, an transmission belts, hose, molded goods, soles and heels, bogie wheels, tank track pads, inner tubes, rubber mountings, reclaimed rubber, proofed goods, dipped goods, sponge and cellular rubber, battery cases, fuel cells, hard rubber goods, deicer boots, and sea markers.

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(*Continued from page* 431)

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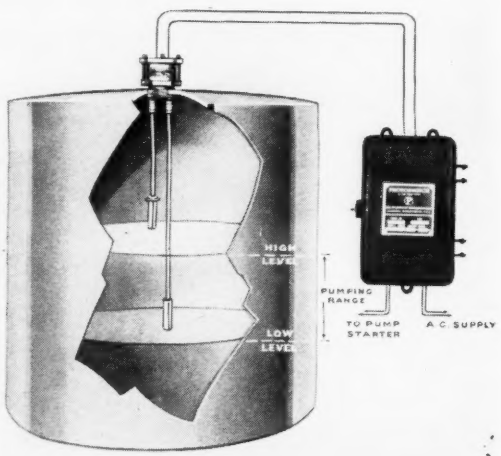

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Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	March, 1946		March, 1945	
UNMANUFACTURED	Quantity	Value	Quantity	Value
Balata ..... lbs.	.....	.....	3,288	$ 1,643
Crude rubber ..... lbs.	3,862,441	$ 794,026	1,006,971	283,007
Latex ..... lbs.	.....	.....	28,716	9,199
Rubber, powdered and waste ..... lbs.	351,700	5,548	793,400	27,804
Recovered ..... lbs.	3,345,300	260,223	2,983,100	211,586
Substitute ..... lbs.	8,375	12,548	5,962	9,824
TOTALS	8,413,141	$1,259,429	5,661,375	$ 804,238
PARTLY MANUFACTURED				
Hard rubber in rods or tubes ..... lbs.	3,329	$ 2,329	996	$ 985
Rubber thread, not covered ..... lbs.	8,357	12,548	5,962	9,824
TOTALS	11,686	$ 14,877	6,958	$ 10,809
MANUFACTURED				
Belting	.....	$ 39,867	.....	$ 27,956
Boots and shoes of rubber, n. o. p. ..... prs.	7,731	4,750	33,903	31,339
Canvas shoes with rubber soles ..... prs.	78	251	10	22
Cement	.....	19,493	.....	22,628
Clothing of waterproofed cotton or rubber	.....	2,008	.....	1,684
Druggists' sundries	.....	37,180	.....	40,631
Gaskets and washers.....	.....	17,091	.....	10,590
Gloves, rubber ....doz. prs.	2,393	7,052	368	1,620
Golf balls ..... doz.	124	576	54	582
Heels ..... prs.	3,452	344	.....	.....
Hose	.....	19,841	.....	25,349
Hot water bottles.....	.....	3,260	.....	2,415
Inner tubes ..... no.	139	734	238	430
Bicycle ..... no.	870	523	24	16
Liquid sealing compound...	.....	12,399	.....	9,207
Mats and matting.....	.....	22,684	.....	1,370
Nursing nipples .....gross	594	2,154	651	1,913
Packing, rubber	.....	14,177	.....	7,710
Raincoats ..... no.	1	22	.....	.....
Tire repair material.....	.....	4,165	.....	8,648
Tires, bicycle ..... no.	1,606	2,057	212	190
Pneumatic ..... no.	324	19,974	119	2,219
Solid, for automobile and motor trucks. no.	26	860	.....	.....
Other	.....	4,031	.....	1,685
Other rubber manufactures.	.....	275,051	.....	165,227
TOTALS	.....	$ 510,544	.....	$ 363,431
TOTAL RUBBER IMPORTS	.....	$1,784,850	.....	$1,178,478

Exports of Crude and Manufactured Rubber

UNMANUFACTURED				
Crude rubber including synthetic rubber ....lbs.	2,628,646	$ 475,727	695,427	245,313
Waste rubber ..... lbs.	1,641,300	23,204	4,612,400	64,030
TOTALS	4,269,946	$ 498,931	5,307,827	$ 309,343
PARTLY MANUFACTURED				
Soling slabs of rubber..lbs.	1,458	$ 350	15,725	$ 3,324
MANUFACTURED				
Bathing caps	.....	240	.....	.....
Belting, n. o. p.....lbs.	392,909	$ 230,652	75,704	$ 43,474
Belts, fan	.....	2,376	.....	.....
Boots and shoes of rubber, n. o. p.....prs.	163,662	304,061	91,069	221,497
Canvas shoes with rubber soles .....prs.	89,752	80,240	.....	.....
Clothing of rubber and waterproofed clothing ..	.....	10,442	.....	7,870
Heels ..... prs.	74,334	6,258	191,107	33,515
Hose	.....	58,347	.....	70,694
Inner tubes ..... no.	41,875	122,462	38,320	139,850
Soles ..... prs.	10,867	2,174	1,614	517
Tires, pneumatic for motor vehicles ..... no.	36,729	711,633	41,881	1,665,967
Other ..... no.	4,765	5,318	1,380	50,232
Wire and cable, insulated..	.....	83,448	.....	283,429
Other rubber manufactures	.....	48,214	.....	161,295
TOTALS	.....	$1,665,865	.....	$2,678,340
TOTAL RUBBER EXPORTS	.....	$2,165,146	.....	$2,991,007

Rubber Clay Consumption Rises

In 1944 the rubber industry consumed a total of 66,748 short tons of clay, the Bureau of Mines, United States Department of the Interior, recently reported. Of this figure, 59,588 tons were kaolin, and 7,160 tons were fire clay and stoneware clay. This consumption represents an increase of 17% over 1943 levels and may be attributed to increased use of clay in rubber compounding during the 1944 carbon black shortage. The future size of the rubber-clay market remains to be determined by research in synthetics and government rubber policies. A total of 17,295,328 short tons of clay was produced during 1944, with Georgia providing 77% of the tonnage, South Carolina 14%, and the remainder mainly from North Carolina, Florida, and Pennsylvania.

Regular and Special Constructions of

COTTON FABRICS

Single Filling Double Filling and

ARMY

Ducks

HOSE and BELTING

Ducks

Drills

Selected

Osnaburgs

Curran & Barry

320 BROADWAY

NEW YORK

Market Reviews

COTTON & FABRICS

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

Futures	Mar. 30	Apr. 27	May 4	May 11	May 18	May 25
June	27.55	27.91	27.49	27.51	27.06	27.78
Aug.	27.54	27.94	27.51	27.65	27.25	27.97
Oct.	27.52	27.95	27.54	27.75	27.43	28.15
1947						
Jan.	27.49	27.92	27.53	27.77	27.54	28.28
Mar.	27.54	27.99	27.62	27.95	27.71	28.48
May	27.50	27.95	27.57	27.95	27.75	28.51

ADVERSE market factors during May kept prices from rising to the high levels scored in the preceding month.

The 15/16-inch spot middling price recorded on May 3 was 28.16¢ a pound. It rose to the high of the month of 28.27¢ on May 9, but by May 17 had dropped to 27.75¢, the low for the month. The closing price on June 1 was 28.77¢.

The price recorded on May 3 for July futures was 27.58¢ a pound; it rose to 27.68¢ a pound (the high for the month) on May 9, then fluctuated until it dropped to the month's low on May 17 of 27.15¢. Prices then rallied and closed at 28.17¢ on June 1.

The major factor causing the depression of prices last month was the continued uncertainty with regard to the coal and railway strikes. Notwithstanding the return of the miners to work, a coal shortage at textile mills appeared likely until both strikes are finally settled. Further caution was prompted by the still pending OPA extension bill. The consensus of opinion in the trade held it likely that the life of the OPA would be extended and with less drastically curtailing measures than were expected last month.

Somewhat easing the market, however, was the favorable statistical outlook. Secretary of Agriculture Anderson announced on May 13, that government owned and controlled cotton was at its lowest point since August 1, 1934, at about 250,000 bales. He also stated that producers hold title to little more than 600,000 bales under the 1944 and 1945 loan programs, and this stock, according to CCC reports, is being reduced about 50,000 bales per week through repossessions. Also adding to the optimism was the favorable weather and increased acreage outlook.

The International Cotton Advisory Committee, having failed to resolve its differences over a proposed international cotton commodity agreement, set up another organization to keep the world cotton situation under constant review. Representatives of 12 governments will be on the executive committee until the next full meeting.

Fabrics

The coal and railway strikes strongly affected the fabrics market in May. The withdrawn position of mills was attributed directly to the coal shortage and transportation difficulties, and the influence of the OPA question on sales policy moved to a secondary position in the opinions of millmen, because changes in ceilings cannot be expected for several months at best. The coal situation, on the other hand, completely disrupted the ability of mills to plan forward deliveries.

The issuance of the new M-317 set asides issued last month appreciably improved the positions for the rubber, automotive, and coating industries, early in the month.

Most coated fabric manufacturers predicted that they would not receive much increase in gray deliveries regardless of the set-aside provisions in M-317A. Continued integration and diversion of looms into higher-priced goods was cutting sharply into the quantity of gray goods being sold. Further hindrance continues to be the shortage of supplies of oils and starches. In the pyroxolin-coated fabrics, it was reported that the castor oil shortage has proved restrictive, and in some cases supplies are inadequate to finish even the limited gray yardage available. While some substitute oils have been found, these can only be had in limited supply and are not so desirable.

Hose and belting ducks are not being accumulated to any appreciable degree, but that production is continually dwindling.

Supplementing its order of April 10, granting price increases of up to 10% to manufacturers of certain types of men's all-cotton waterproofed protective clothing, the OPA on May 7 directed that where there is a wholesale-retail relation, 25% of the price increase is to be absorbed by wholesalers and 75% by retailers. The amendment, No. 10 to SR-14E, was effective on May 11.

Conditions in the raincoat market remain unchanged. All types of goods are very scarce, with practically no free goods being offered. The raincoat trade, therefore, is having great trouble in securing enough cloth to keep production going.

The January-March production of viscose-cupra yarn reached 122,500,000 pounds, 6% above the fourth quarter of 1945 figure, and 46% of this output was of viscose tire-type yarns. Shipments to the domestic trades show that an increase of 5% over the last quarter of 1945 went to tire users.

New York Quotations
June 1, 1946

Drills

38-inch 2.00-yard	yd.	$0.195
50-inch 1.52-yard		.3075
52-inch 1.85-yard		.25293
52-inch 2.20-yard		.2170
59-inch 1.85-yard		.3050

Ducks

38-inch 2.00-yard D.F.	yd.	.24375
40-inch 1.45-yard D.F.		.31125
40-inch 1.45-yard S.F.		.3239
51½-inch 1.35-yard D.F.		.36125
72-inch 1.05-yard D.F.		.4825

Mechanicals

Hose and belting	lb.	.5030

Tennis

51½-inch 1.35-yard S.F.	yd.	.35375
51¾-inch 1.60 yard D.F.		.31125

Hollands—Rubber

20-inch	yd.	.1225/.145
30-inch		.22 /.2575
40-inch		.245 /.29

Osnaburgs

36-inch 2.94 Cl.	yd.	.1373
40-inch 2.11 P.W.		.1766
40-inch 2.65 Cl.		.15219
40-inch 3.65 Cl.		.11768

Raincoat Fabrics

Cotton

Bombazine 64 x 60, 5.35	yd.	.1375
Bombazine 64 x 56, 5.50		.1350
Print cloth, 38½-inch, 64 x 60.		.11369

Sheeting, 40-Inch

48 x 44, 5.00-yard	yd.	.182
64 x 68, 3.15-yard		.15555
56 x 60, 3.60-yard		.13333
44 x 40, 4.25-yard		.10941

Sheeting, 36-Inch

48 x 44, 5.00-yard	yd.	.96
40 x 40, 6.15-yard		.7804

Tire Fabrics—Karded Peeler

Builder

17¼ ounce 60" 23/11 ply	lb.	.48

Chafer

14 ounce 60" 20/8 ply	lb.	.48
9¼ ounce 60" 10/2 ply	lb.	.45

Cord Fabrics

25/5/3, 1 1/16" cotton	lb.	.44
15/3/3, 1 1/16" cotton	lb.	.42
12/4/2, 1 1/16" cotton	lb.	.42
23/5/3, 1¼" cotton	lb.	.44

Leno Breaker

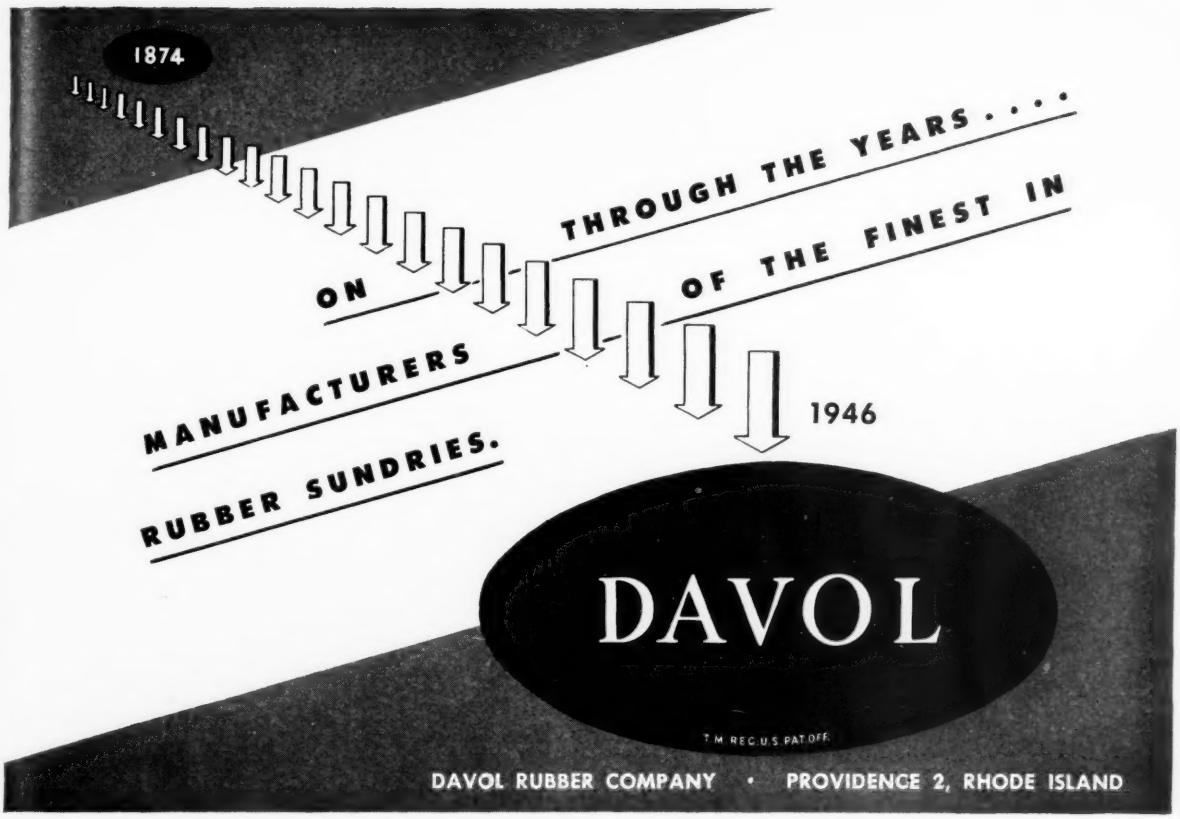
8¼ ounce and 10¾ ounce 60"	lb.	.45

SCRAP RUBBER

THE scrap rubber market continued to show very little activity last month. No particular effort on the part of the reclaimers to get additional material was noted, although offerings of some of the more desirable grades were being absorbed at quotable levels. Early in the month beadless tires delivered at Akron rose 50¢ to $24.50 per net ton. Most of the S.A.G. stocks were not being quoted. Movement of the synthetic rubber grades was still very small, and not much of the recap grades was being absorbed.

Reports from dealers at Akron and in the East indicate growing restrictions on tire shipments. It is reported that Akron consumers are limiting shipments of mixed auto tires to 75% passenger and 25% truck and bus. A maximum of 15% synthetic scrap in these shipments is being accepted, and excesses are penalized. The situation in the East is about the same, with consumers in one section limiting shipments to 10% synthetic plus the condition that higher percentages will be taken only if passenger and truck and bus tires are weighed and loaded separately.

Outlets for tire parts continue to decrease. Only one consumer in the East is reported to be in the market for peelings, with synthetics definitely excluded. At Akron all tire parts except for No. 2 and 3 natural grades are being refused. Splitters are facing narrowing outlets for their tire patches and reliners. Some are reported swinging over



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OUR ENGINEERS WILL GLADLY CALL AT YOUR CONVENIENCE

to the production of rubber linkmats; while others are facing entire loss of business.

Two amendments to RPS 87 were issued by OPA. Amendment 14, effective May 6, placed ceiling prices on black carcass scrap rubber at $40 per short ton delivered at Los Angeles, Calif., and $50 delivered at all other consuming centers. Amendment 15, effective May 22, amended the definition of solid tires to include solid tank track block tires in addition to solid motor truck tires.

As previously announced, this issue marks the first listing of actual dealers' buying prices for scrap rubber, both at Akron and in the East. The former listing of scrap ceiling prices has been discontinued, although revisions or deletions in ceiling prices by the OPA will be given as they occur.

Following are dealers' buying prices for scrap rubber in carload lots, delivered at points indicated.

	Eastern Points	Akron O.
	(Net tons)	
Mixed auto tires	$ 17.50	$ 18.00
Truck and bus tires	17.50	17.50
Beadless tires	23.00	24.50
S.A.G. passenger (natural)	17.50	nom.
(synthetic)	nom.	nom.
S.A.G. truck (natural)	15.50	nom.
(synthetic)	nom.	nom.
No. 1 peelings (natural)	44.00	nom.
(recap)	37.00	nom
(synthetic)	nom.	nom.
No. 2 peelings (natural)	30.00	30.00
(recap.)	23.00	nom.
(synthetic)	nom.	nom.
No. 3 peelings (natural)	27.00	27.00
(synthetic)	nom.	nom.
	(¢ per lb.)	
Mixed auto tubes	5.5	5.25
Red passenger tubes	7.25	7.25
Black passenger tubes	6.25	6.25
Black truck tubes	6.0	6.125
Mixed puncture-proof tubes	2.0	2.0
Air brake hose	nom.	nom.
Rubber boots and shoes	nom.	nom.

RECLAIMED RUBBER

NO ALLEVIATION in the tightness of the reclaimed rubber market was apparent during the past month, or can be foreseen for the remainder of the year. The excess demand for all types of reclaim continued with orders piling up and deliveries still running two months behind on the average. Despite capacity production, reclaim figures remain below wartime averages with the major cause being the increase in contamination of natural rubber scrap with synthetic. Although this contamination is unavoidable, it takes its toll in decreasing total production. As a counter-measure, more penalties are being placed on excess percentages of synthetic rubber scrap in natural shipments. These penalties have largely failed to improve segregation of scrap as the higher percentages of synthetic are due mainly to inability to identify type of retread material, especially for tires that have retreads which are worn down.

Because of its higher price, straight synthetic rubber reclaim is still in very little demand. However a slowly rising demand for synthetic reclaim is expected because of the general market tightness.

Preliminary figures for March show an increase to 25,148 long tons in reclaim production over the 23,187 long tons produced in February. Consumption of reclaim in February was 20,702 long tons and in March, according to preliminary figures, 22,101 long tons. Exports of reclaim also rose during this period, with 1,368 long tons exported in February and approximately 1,841 long tons in March. End of the month stocks of reclaimed rubber totaled 30,216 long tons in February and approximately 31,422 long tons in March.

An advance release from OPA states that, effective May 31, manufacturers' maximum prices for reclaimed rubber have been increased by ½¢ a pound to take care of recent increases in wages and material costs. At the same time, ceilings have been similarly raised for the service of processing scrap rubber into reclaimed rubber. These changes are covered by Amendment 7 to RPS 56—Reclaimed Rubber—and Amendment 2 to Supp. SR 35 to RMPR 165—Services. This increase in price is not shown in our listing of ceiling prices this month, but will be made upon receipt of the actual OPA amendments.

Reclaimed Rubber Prices

	Sp. Grav.	¢ per Lb.
Auto Tire		
Black Select	1.16-1.18	7 / 7¼
Acid	1.18-1.22	8 / 8¼
Shoe		
Standard	1.56-1.60	7½/ 7¾
Tubes		
Black	1.19-1.28	11¾/12
Gray	1.15-1.26	12½/13½
Red	1.15-1.32	12¼/13
Miscellaneous		
Mechanical blends	1.25-1.50	5 / 6

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

Fixed Government Prices*

	Price per Pound	
	Civilian Use	Other Than Civilian Use
Guayule		
Guayule (*carload lots*)	$0.17½	$0.31
Latex		
Normal (*tank car lots*)	.26	.43½
Creamed (*tank car lots*)	.26¾	.44¼
Centrifuged (*tank car lots*)	.27¾	.45¼
Heat-Concentrated (*carload drums*)	.29½	.47
Plantation Grades		
No. 1X Ribbed Smoked Sheets	.22½	.40
1X Thin Pale Latex Crepe	.22½	.40
2 Thick Pale Latex Crepe	.22	.39½
1X Brown Crepe	.21⅜	.38⅞
2X Brown Crepe	.21⅛	.38⅝
2 Remilled Blankets (Amber)	.21¼	.38¾
3 Remilled Blankets (Amber)	.21⅛	.38⅝
Rolled Brown	.18	.35½
Synthetic Rubber		
GR-M (Neoprene GN)	.27½	.45
GR-S (Buna S)	.18½	.36
GR-I (Butyl)	.15½	.33
Wild Rubber		
Upriver Coarse (crude)	.12⅝	.26⅛
(washed and dried)	.20¼	.37¾
Islands Fine (crude)	.14⅝	.28¼
(washed and dried)	.22½	.40
Caucho Ball (crude)	.11⅝	.24¾
(washed and dried)	.19½	.37
Mangabiera (crude)	.08½	.19¾
(washed and dried)	.18	.35½

* For a complete list of all grades of all rubbers see Rubber Reserve Co. Circular 17, p. 169, May, 1943, issue.

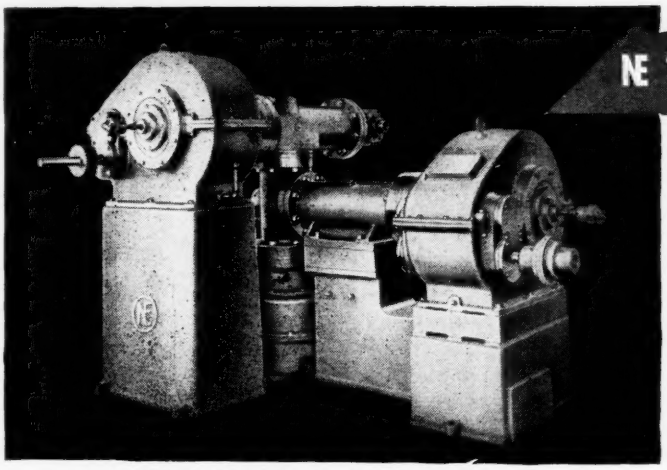
Rims Approved and Branded by The Tire & Rim Association, Inc.

Rim Size	Apr., 1946
15" & 16" D. C. Passenger	
16x4.00E	326,093
16x4.50E	151,482
15x5.00E	69,955
16x5.00F	25,105
15x5.50F	4,531
16x5.50F	7,363
16x6.00F	5,300
16x4.00E—Hump	229,281
15x4.50E—Hump	79,914
16x4.50E—Hump	3,163
15x5—K	13,791
16x5—K	92,434
15x6—L	40,269
16x6—L	25,798
Flat Base Truck	
20x3.75P	4,599
17x4.33R	8,033
20x4.33R	42,238
15x5.00S	2,907
20x5.00S	213,270
24x5.00S	609
20x6.00T	67,854
24x6.00T	572
20x7.00T	7,599
18x7.33V	1,348
20x7.33V	82,207
22x7.33V	17,542
24x7.33V	1,073
19x8.37V	374
20x8.37V	743
24x8.37V	685
Semi D. C. Truck	
16x5.50F	6,168
Tractor & Implement	
12x2.50C	13,270
12x3.00D	18,655
15x3.00D	7,279
16x3.00D	6,912
18x3.00D	1,047
19x3.00D	15,481
36x3.00D	1,374
20x4.50E	3,367
36x4.50E	1,027
18x5.50F	18,814
24x8.00T	2,618
28x8.00T	710
32x8.00T	112
W8-24	5,946
W8-32	1,488
W9-28	3,884
W9-38	1,889
W10-24	274
W10-36	538
W10-40	226
W11-24	6,694
W11-28	2,518
W11-32	475
W11-36	250
DW8-38	814
DW9-38	233
DW10-36	4,224
DW10-38	2,473
DW12-25	4,697
DW12-30	6,213
Earth Mover	
24x15.00	328
Total	1,666,130

Trade Lists Available

The Commercial Intelligence Division, United States Deparment of Commerce, recently compiled the following trade lists, of which mimeographed copies may be obtained by American firms from this Division at $1 a list for each country.

Automotive Equipment Importers and Dealers—Canada; Uruguay; Cuba; Guatemala.
Chemicals Importers and Dealers—Uruguay.
Rubber Goods Manufacturers—Brazil.



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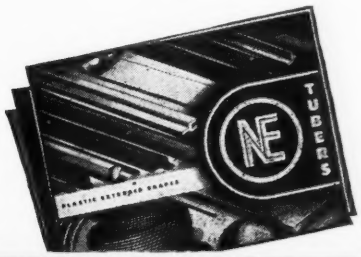
NE *Triple* STAGE EXTRUDERS

National Erie engineers have recently developed a compact 3 stage extruder that offers thorough plasticizing of difficult plastics.

An independent drive is provided in each stage with progressive controlled heating.

NE single, double and triple stage extruders permit us to offer the right extruder for the job. Consult with NE engineers.



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Synthetic Rubber Latex Compounds
Synthetic Resin Compounds and Adhesives
Synthetic Latex Adhesives
Aqueous Dispersions of Reclaimed Rubber

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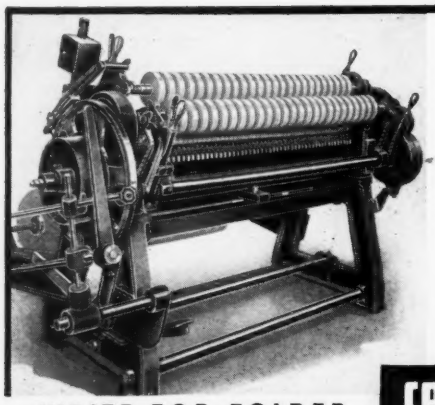
Trade Mark



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CAMACHINE 26-3A is ideally suited to slitting narrow strip across the full width of the web. Manufacturers and converters of such varied materials as insulating tapes, impregnated fabrics, condenser tissue, artificial leather, starched cloth, pipe wrapping, gutta-percha tape, varnished paper and cloth, cable wrap and masking tape, will find this equipment very efficient and productive in operation.

CAMACHINE 26-3A is designed for economical production of large quantities of narrow strip in rolls.

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Stamford Neophax Vulcanized Oil

(Reg. U. S. Pat. Off.)

For Use with Neoprene

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Makers of Stamford "Factice" Vulcanized Oil

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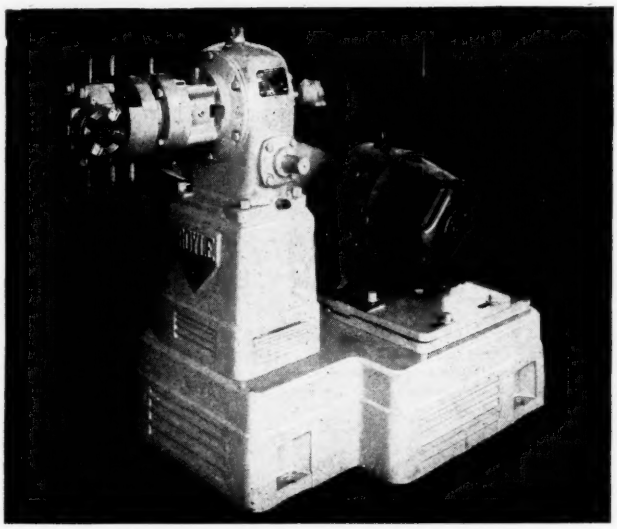

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Primarily designed to become an integral part of laboratory equipment (the technician can be sure that his experiments will have true relation to actual product extruding) the Royle #1 is an efficient producer of such commercial products as tubes, fine wire insulation, mono-filament and thread coating.

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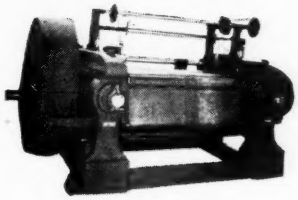

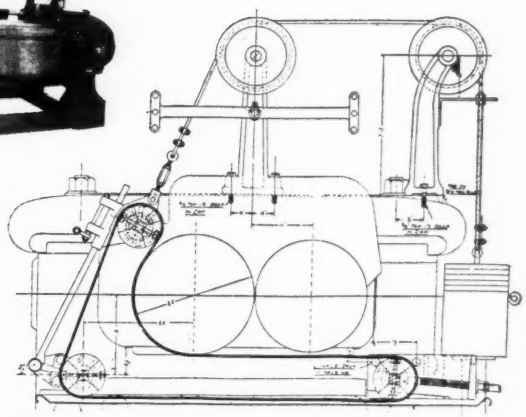

MILL APRONS eliminate a large part of the hard work in milling and masticating—and reduce the dust element as well. Available in sizes up to 84″ wide. In wide use today to help overcome longer milling time of synthetics.

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Akron — "The Established Measure of Value" — Ohio

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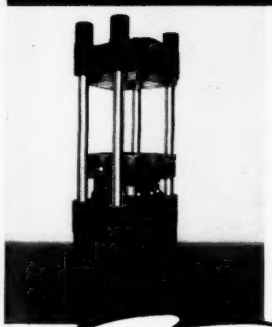

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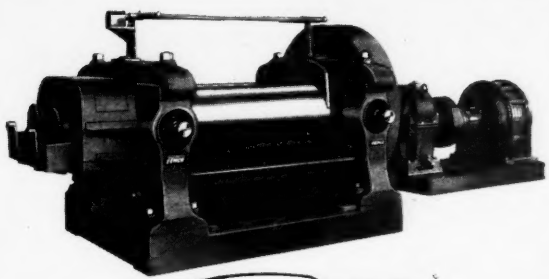

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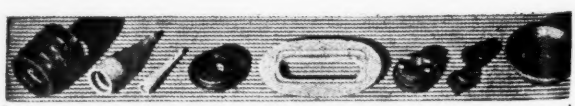

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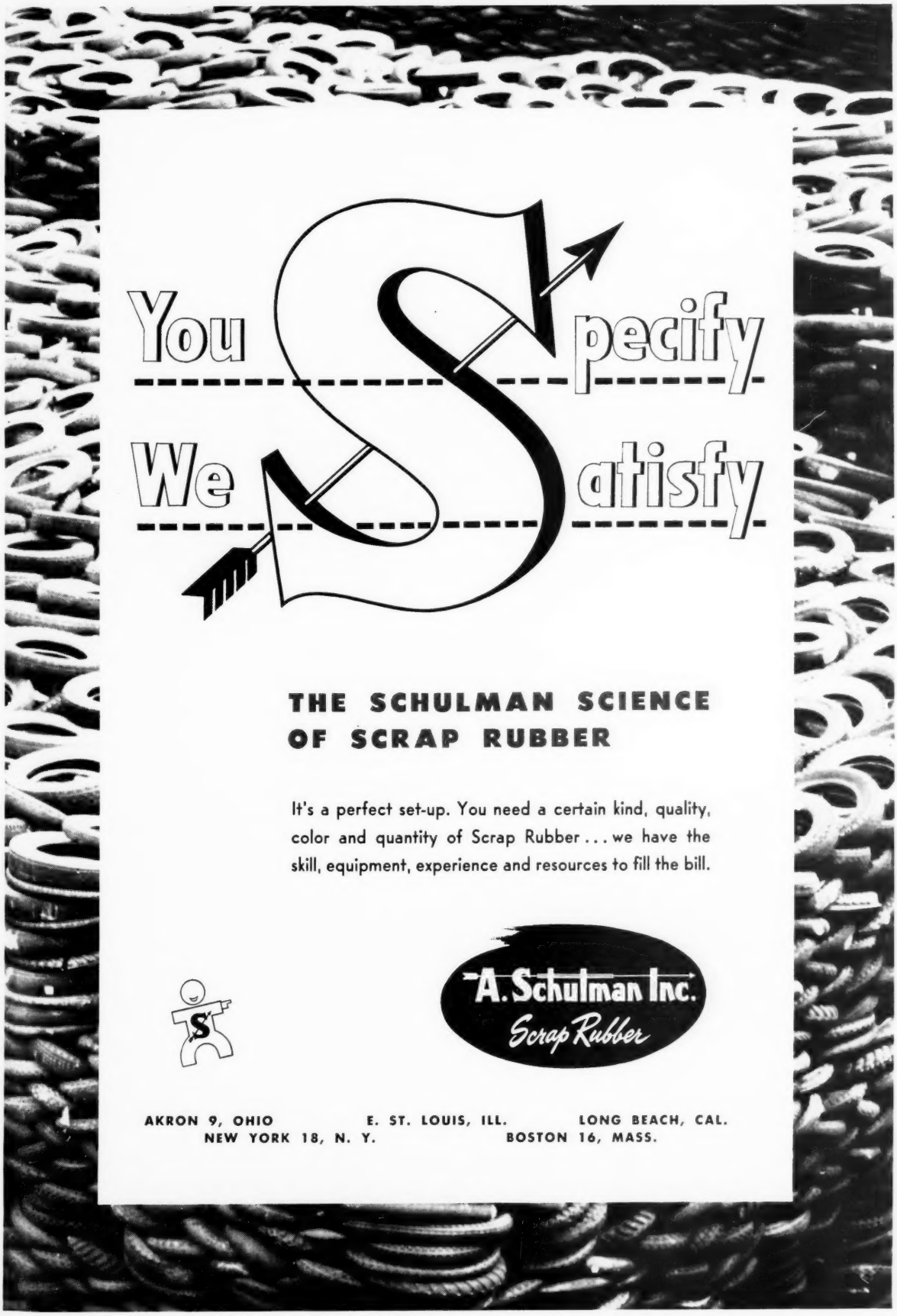
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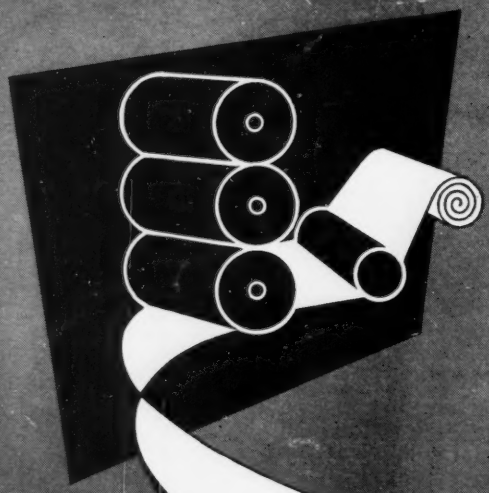

FACTS *about* LINERETTE

- *Linerette is a specially prepared interleaving paper*
- *Linerette preserves the tackiness of the stock*
- *Linerette contains no oil or wax which might migrate*
- *Linerette has been used for 20 years*

Introduced in 1925, and designed for use in separating light weight rubber stocks, Linerette is thoroughly tried and proven. It is a specification sheet, made to rigid standards of quality.

We do not suggest Linerette as a substitute for Holland cloth; however, we have reason to believe that some companies are using it in this manner with success.

This paper may be obtained in any width up to and including 54", and is furnished in rolls of 9", 11½", 13", and 15" diameters; put up on 3" i.d. cores. The yield is approximately six square yards to the pound. A 9" roll contains about 375 linear yards and a 15" diameter about 1150 linear yards. Investigate Linerette *now*. Write for samples, specifying width desired.

THE CLEVELAND LINER & MFG. CO.

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Illustrated booklet tells about Climco Liners and Linerette. Tells how to get better service from liners. Write for your copy.

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★ **LINERETTE** ★

INTERLEAVING PAPER